Engineering and Mining Journal

McGraw-Hill Co., Inc. Price, 20c. New York, July 19, 1919

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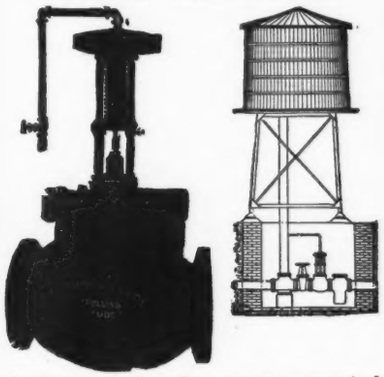
GOLDEN-ANDERSON

Patent Automatic Cushioned Controlling Altitude Valves



1. Necessary for the proper economical operation of your pumping plant.
2. Automatically maintain a constant stage of water in reservoirs, standpipes and tanks.
3. No floats or fixtures. Self-contained and positive in operation.
4. Three ways of closing—By water—by electricity from distant points—by hand.
5. Will work both ways on a single pipe line.

GOLDEN-ANDERSON

Patent Automatic Cushioned Water Pressure Reducing Valves

Sizes to 24 in.

1. Maintain a constant reduced water pressure at all times.
2. Perfect cushioning by both water and air.
3. Easily adjusted from the outside and stay adjusted.
4. Fitted with cups and seat rings to take all wear and prevent metal-to-metal seats. Valves virtually indestructible.
5. Positive in closing. No water hammer, surges or burst mains.
6. May be fitted with simple electric attachment for instant full opening from distant points.

CHARLES E. GOLDEN
President and General Manager

Mr. Golden says:—

Prevent possible loss of life, destruction of your property and the probability of a complete shutdown by equipping all boiler steam connections with

GOLDEN-ANDERSON

Life and Property Insurance Valves

1. Should a tube rupture, the boiler containing it is instantly isolated, thus stopping escape of steam from other boilers.
2. Prevention of explosions in case of steam pipebreaks, by shutting off flow from all the boilers.
3. Gives automatic equalization of steam pressure.
4. Fool proof; as they cannot be opened by hand and so obviate danger of admitting steam into cold boiler.
5. **The only valves which can be tested during service.**
6. Pounding, chattering, spinning and sticking eliminated by double cushion, "Corliss Dash."

GOLDEN-ANDERSON VALVE SPECIALTY CO.

1218 Fulton Bldg.
Pittsburgh, Pa.

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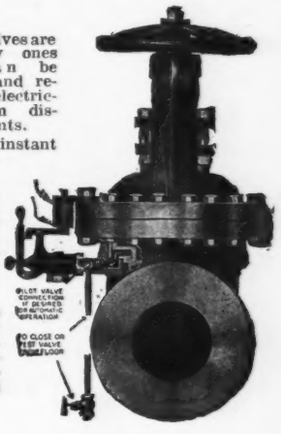
Pat. Double Cushioned Quick Closing Emergency Trip Valves

1. These valves are the only ones that can be tripped and reset by electricity from distant points.
2. Give instant control of steam.
3. Double Corliss Dash-Pots prevent all pounding, spinning and chattering.
4. Double extra heavy construction. Occupy minimum head room.



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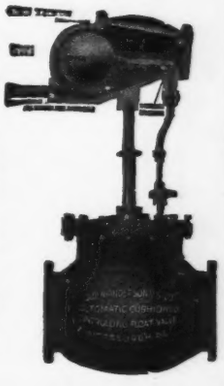
Patent Automatic Cushioned Controlling Float Valves

1. Perfectly controls the water level between two fixed heights in open tanks, hot wells, heaters, standpipes, etc.
2. Can be adjusted to operate either quickly or slowly.
3. Will operate on as low as ½ to ¾ in. variation in water level.
4. Perfect cushioning obtained by both water and air. Sizes to 24 in.



GOLDEN-ANDERSON

Storage Problems—

Store and Reclaim with Belt Conveyors

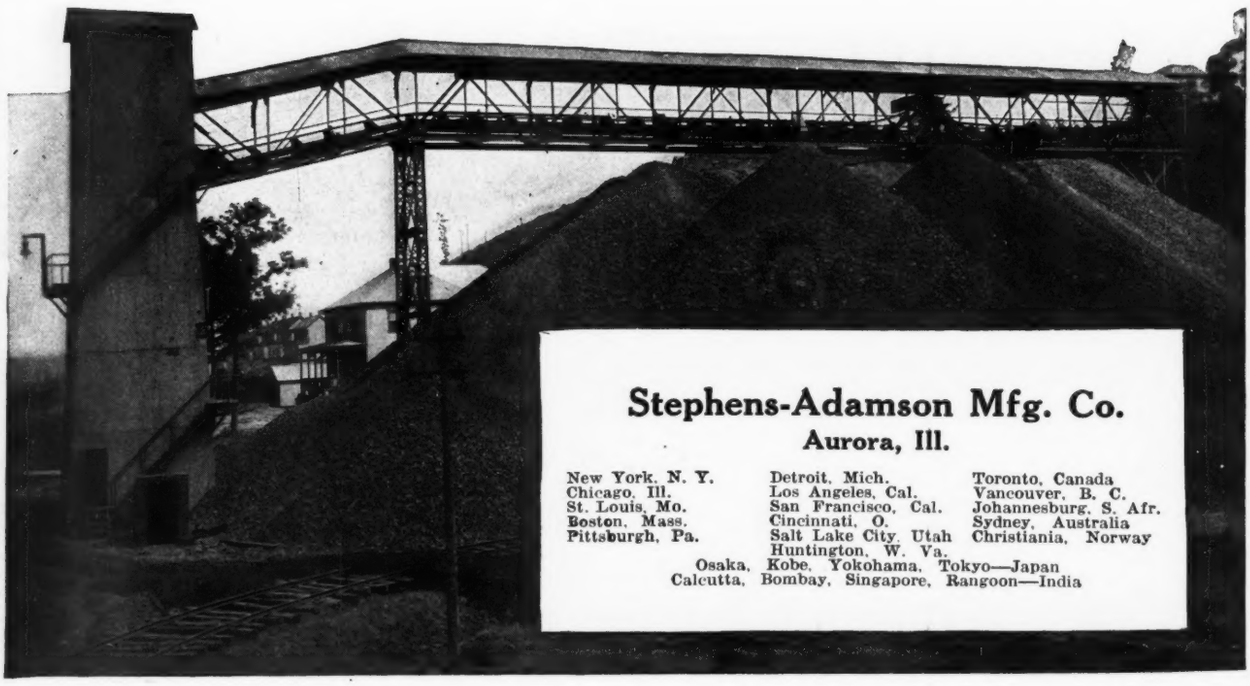
IT IS important, though, to have the right belt conveying equipment, conveyors which are correctly designed and well built.

THE initial cost of Stephens-Adamson Mfg. Co. machinery may be somewhat higher, but the ultimate value of a conveying installation cannot be determined by the first cost.

STEADY, reliable service is assured with the incorporation of S-A Products in a storage system.

S-A Unit Ball Bearing Carriers are strong, light weight and they operate so smoothly and easily—saving in power and belt wear.

Write for data on storage systems.



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Engineering and Mining Journal

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Volume 108 | New York, Saturday, July 19, 1919 | *Number* 3

So Go Back to Your Meat And Enjoy it.

IN A RECENT issue of the *New York Tribune* there appeared an advertisement from which we take the following extract:

"The war is over; and all restrictions on meat are off. Now you may eat all you want with a free conscience—beef, lamb, veal—three times a day if you wish. You have done splendidly; you have helped win the war by denying yourself meat, as you have in dozens of other ways. But you needn't hold off any more; it's over 'over there' forever. Most of the boys are back at work; Army meat demands are no longer a strain. England and other European countries do not have to depend solely upon us any more. Ever since the beginning of the war, the American livestock raiser has been raising so much more livestock that there is plenty to go 'round. *So, go back to your meat and enjoy it.*"

There is a naïveté about this that compels an irresistible chuckle. It is signed by a number of livestock associations. Evidently they expected the public to take the whole matter quite seriously and immediately to place heavy orders for tender, juicy cuts, thick tenderloins, and roasts like those of the good old days. Can't you imagine the cattleman standing, hat in hand, and wafting the good people to the butcher shops? What a fine belief he has in all humanity!

Bolshevism will never take a hold on this country while we have such confiding and honest people as our cattlemen. Evidently there is an overplus of meat, and instead of letting the law of supply and demand take its course, our friends ignore it and trust to a stampede to follow on their sweeping permission to eat more beef and lamb. Perhaps they have associated so long with lambs that they have a strong belief in the lamb-like qualities of the great American public.

The copper producers may well take lessons from this. They cut their prices sharply when copper became a drug upon the market and just as quickly they curtailed production. Why did they not issue a manifesto to the public along similar lines? Live and learn is the order of the day.

A Mexican Policy Essential

THOUGH no official announcements have come from Washington respecting any new policy as to our relations with Mexico, an atmosphere of expectancy hangs over the Capital. Rumors are rife to the effect that the President has had several conferences with the State Department respecting this subject since his return to Washington. His personal calls on Mr. Daniels and Mr. Baker have been interpreted as having to do with Mexican affairs.

It is suggested that President Wilson will address Congress regarding Mexico somewhat on the lines of the McKinley message which led to intervention in Cuba. We scarcely anticipate that the Executive will take precisely this view, as conditions in Mexico do not closely parallel those that caused intervention in Cuba. Moreover, it will be recalled that during President McKinley's administration the voice of the jingo statesmen was heard above that of the saner, wiser advocates of intervention.

Appeals to the President and the State Department have for several years been strong and insistent, but they have not been tinged with any coloring of jingoism. Our citizens have asked for intervention of some kind because their brothers, though obeying the laws of the land, have been maltreated or murdered. Property has been confiscated through decrees or some form of taxation, and millions of dollars' worth has been rendered valueless because its owners have been forced to abandon it.

Bad as this story of governmental mismanagement and obliquity has been, it is not all—it is not the worst. Our citizens have made their personal wrongs and sufferings known to us from time to time, but the wrongs to thousands of Mexican citizens have been rather overlooked on this side of the line.

The small group controlling Mexican affairs for the last few years has been the cause of death and suffering among its own people to a far greater extent than among foreigners. Thousands of natives have felt the incompetency or dishonesty of the present government for every score of foreigners that have felt it. The money that foreigners have lost, and about which we hear much, is not to be compared with the internal losses in property and life. It is these poor people who call feebly but insistently for our help. Theirs is not a jingo call. They call for no war in their country, no revolution against any government. They ask only for succor in their rags.

Two months ago the writer sat in a dirt-floored house of two rooms with an octogenarian of the Diaz type. He was a man of affluence and influence during the Diaz regime and was well known to two of our own presidents. There was no complaint that thousands of head of cattle had been driven from his ranch, or wantonly slaughtered for their hides—no complaint that he had been driven from his home and was now living on a precarious charity; but tears came to his eyes as he told of the little children who were dying from starvation at the old hacienda, their fathers dead or forced to join some band of robbers as the only visible means of existence.

It was announced on July 11 at the Methodist Centenary Exposition in Columbus, by Dr. R. N. Bridge, that $8,000,000 would be made available for the benefit of Latin America and Mexico and that the first call on this fund was for saving the lives of 1,500,000 orphans in Mexico. This is an admirable charity and one that should be supported, but of more importance

is the eradication of the cause that produced these orphans and will produce thousands more if our statesmen can find no way of improving the conditions south of the Rio Grande.

We want no war with Mexico. Our boys have seen all the war that they care to see; but most emphatically we do need peace and order in our neighbor's country. The work ahead of our Government is the work of statesmen, not of warriors. Unfortunately, negotiations cannot be taken up with statesmen. They must be initiated with politicians and bandits, and because of this fact our statesmen may require—probably will require—the moral and physical support of the military arm of our Government.

With the United States temporarily controlling the civil government of Mexico, its courts, customs, schools and national industries, and with order guaranteed, there would be a marvelously rapid return to prosperity. Mexico is capable of a prosperity that would amply and quickly pay all of its obligations. If the real patriots of Mexico are given an opportunity to assist themselves, this work will be done without the application of outside force, and, as with Cuba, our physical support will not be required for long.

England and France are anxiously looking forward to the day when the United States shall say that order must be restored. Some of the constituents of every American Congressman are asking it. Silently, but no less earnestly, millions of Mexicans are praying for it. May our statesmen soon see the way to do that which it is their duty to do, and to do it in a manner that will produce the least possible bad feeling.

Friction there will be, but it will be with the incompetent, the dishonest, the oppressors of their fellow men; and we trust that this friction may be so intense as to seer the hands of the rapers of their country so deeply that they will never again touch political intrigues.

Serious Condition of the Gold-Mining Industry of South Africa

THE unfortunate situation in which many American gold mines have been placed through the fortunes of war has been a matter of serious consideration by the owners of mining properties, and the gravity of this condition has not been relieved by the report of the commission appointed to investigate the situation and suggest remedies.

Practically no relief was suggested, and the American gold miner is left to work out his own salvation. Perhaps even more serious is the condition in South Africa, where nearly all of the ore is of low grade and where the margin of profit was narrow even before the war. The output of the South African mines in 1918 was $176,000,000, compared with the total world's production of approximately $377,300,000. A material reduction in the Transvaal output means a curtailment in the world's production, and if some remedial steps are not taken soon the output for 1919 will be seriously curtailed. The *New York Times* of July 5 quotes F. S. Malan, Acting Prime Minister, as reporting that on the Central Rand six mines out of sixteen were worked at a loss for three months ended February, 1919. Mr. Malan states:

"These six employ 2,271 Europeans, and the shortage amounted to $140,000, while the expenditure in wages and stores amounted to $12,387,940 for the last year. Out of thirteen mines in the Near East Rand, five had losses in the three months amounting to $145,000. They employ 2,518 Europeans, and last year they expended $13,953,520. Of nine mines on the West Rand, five worked at a loss which aggregated $153,700. The profit of the other four was $172,775, leaving a credit balance of $6,175, which, of course, is insufficient to meet capital expenditure, interest on debentures, taxation, and other charges. The unprofitable five employ 1,156 Europeans, and they expended in wages and stores last year $6,976,810.

"The grand totals show that forty-six mines on the Witwatersrand employ 22,035 Europeans. Thirty mines made profits aggregating $8,173,775; sixteen showed deficits amounting to $438,540 during three months, and the total expenditure on stores last year was over $125,000,000. Of course the figure of working profit is not all distributable, as out of it has to come interest on debentures, loans, capital expenditure, government taxation, and to a certain extent miners' phthisis contributions. The eight richest mines, which are on the Far East Rand, show a working profit for the three months of $5,905,240."

Sir Evelyn Waller, President of the Transvaal Chamber of Mines, in a letter to the Acting Prime Minister, complains of the failure of the government to take action to avert the impending crisis, despite repeated urgings and warnings. Even a request to recruit an experimental number of native laborers from north of latitude 22 degrees south—that is, in tropical Africa—with a view to offsetting in a measure the great shortage of labor resulting from the war, has not been acted upon, and Sir Evelyn says:

"The position foreshadowed by the chamber so many times is now at hand. So far as we can see, nothing can now prevent a number of important mines, employing a large number of Europeans and upon whose operations the prosperity of a considerable section of the Witwatersrand depends, from ceasing operations in the next few months."

Mr. Malan continues: "The menace of the grave problem which the unemployment and distress that this shutting down would involve moved the government in replying, through the Secretary of Mines and Industries, to urge, should the closing down become unavoidable, that this be done with the maximum possible interval between the dates selected for this action by the different mines. The government also considers that the appointment of a small commission to report on the reasons and necessity for the closing down of each mine before the date of cessation of operations would have a valuable effect and would tend to keep public opinion informed as to the causes which are operating in connection with the industry. Such a commission should, in the opinion of the government, be composed of a government representative and one or more representatives of the chamber and of the workers."

Hurley a Loss to the Mining Industry

WHEN E. N. Hurley quit the position as head of the Shipping Board, the mining industry of the western hemisphere lost one of its best friends. Such energy in construction work has seldom been exhibited as Mr. Hurley has shown in the building of an American merchant fleet. With many vessels built and the war over, he promptly concluded that the ships could be usefully employed in plying between North and South America, and it was expected that the same energy

would be exhibited in establishing trade routes, to such advantage to Latin America and ourselves that European ship-owners could not break in. South America has mines, and we need her minerals. North America builds the best mining machinery that is manufactured, and we need an energetic agent to bring about an exchange of these commodities.

Let us hope that Mr. Hurley's successor has the same energy and vision, and that ample opportunity will be offered the South and Central American producer to send his ore and metals to this country, and to receive from us the goods and machinery that he requires.

Protecting American Rights In Mexico

EARLY in the present year there was formed in New York a national association with the object of securing through the United States Government that protection in Mexico to which all American citizens and their property are entitled. The method of procedure which the executive committee of this association adopted cannot be criticised. Though it is quite natural that regret is expressed because little has been done toward bringing order out of chaos, the efforts of the organization are being directed toward securing authentic information respecting Mexican conditions and in placing this information before our Government officials and the public.

Most Americans have but scant appreciation of Mexico and present conditions in that republic. So little do they know, that there is no evidence of interest in or a desire to acquire more information. A general impression prevails that Americans who have gone to Mexico are adventurers and ne'er-do-wells who have left their native land to cast their lots in a country of precarious opportunities, and that, having done so, they have stepped beyond the pale of American protection. It is with the idea of educating the American public to the fact that this is not the case that the association mentioned has started its campaign of publicity; but beyond this, and of even greater importance, is its publication of the conditions under which the Mexican people are living today.

We have recognized as a duly-elected government a president and his supporters who have wrecked the industries of the country, increased taxation, reduced the number of schools, and continue to pile up the obligations of the country under a dictatorship of incapacity, if not dishonesty.

The first bulletin of the association was issued on July 1, and we cannot read it without feeling the keenest sympathy for those who are patiently waiting for better things, or dying of starvation, crushed under the heel of the latest liberator.

Our Bill Was Thirty Billions

LAST week Secretary Glass made public the latest calculation of our share of the war's expenses—a little over thirty billions of dollars. This is a staggering amount when thought of in dollars alone; yet it is not so colossal when we remember that nearly 30 per cent has already been met by taxes. Or shall we say that it is a colossal sum, and that our resources for meeting the obligation are colossal also?

As large as these figures are, they pale into insignificance when compared with the costs that have been laid upon our Allies. Their burdens have been not only in money but in property and lives that cannot be brought back. The resources of our friends will probably enable them to pay their bills in the course of time, but it will be generations before the destruction of life and property will cease to be felt.

We can congratulate ourselves that our bill was only 300,000 casualties and thirty billions of dollars, a third of which sum was loaned to our Allies. And when it comes time to collect interest on this loan, and time to pay back the principal, let us remember that the money was spent for us every bit as much as for themselves; that Frenchmen, British, Italians, and Belgians were dying for us while using the ammunition that our money bought. They were fighting our battles; they were saving our lives and our Republic.

The suggestion has been made that the United States cancel its European loans made on account of the war. The suggestion is not fantastic, and it would not be altogether bad business. We owe a moral obligation to our Allies, an obligation that we will recognize less and less as the years pass by. We cannot cancel this obligation with money, but we can alleviate the sufferings of those who have borne the brunt of the strife if we do not exact the last pound of flesh.

The Never-Ending Circle

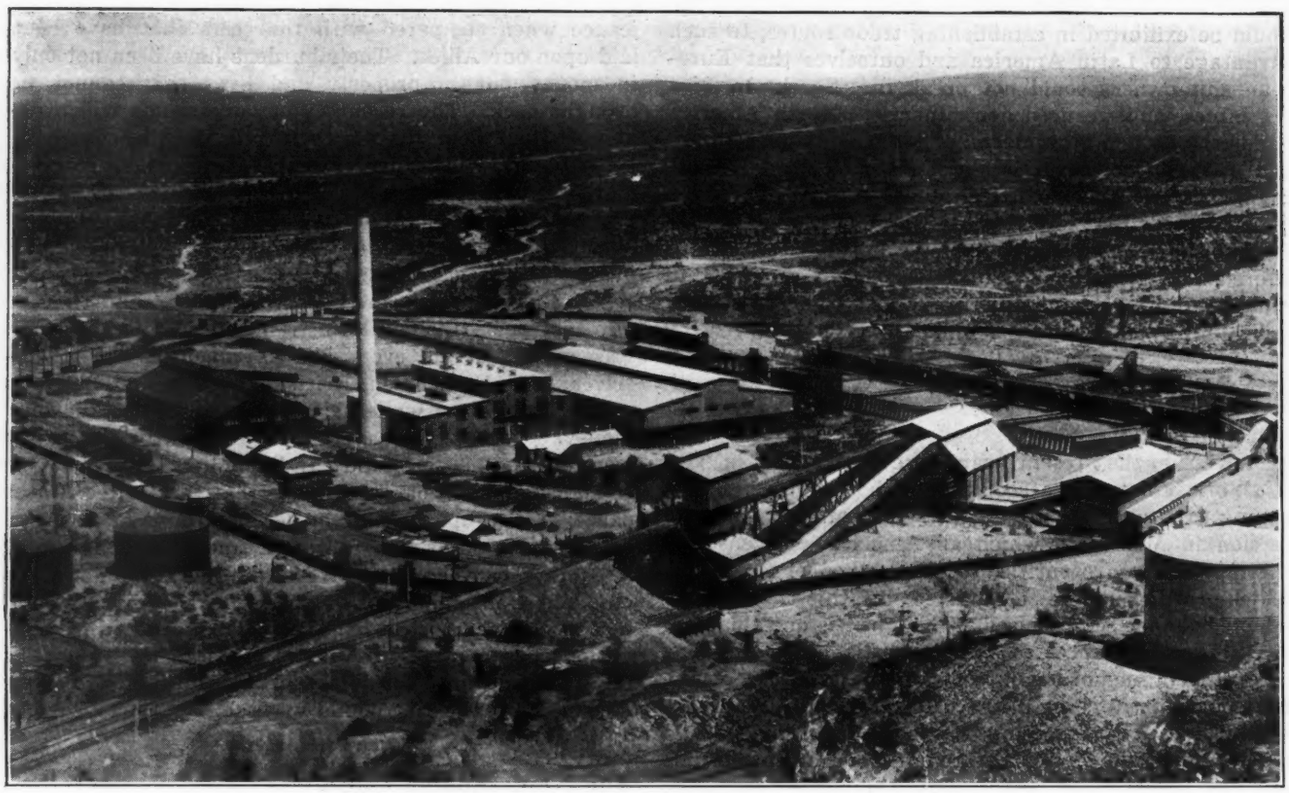
THE British government has again raised the price of coal to the consumer, this time only six shillings per ton. The increase is to meet the higher cost of wages and the reduction in working hours. This is perhaps one of the most severe blows that labor has given itself for some time. It is surely a boomerang that will be felt most seriously by those employed in the manufacturing and export industries.

Great Britain has little water power. Her industries have been built upon her coal mines, and unless every manufacturing and shipping nation experiences a like increase in the cost of fuel, England places a handicap upon her business that no adjustment at home can meet. But if every nation should do the same, it would be equivalent to marking up the price of every product that labor consumes, and labor would gain nothing but the illusory pleasure of having more money pass through its hands in a given time.

Some day, some time—it may be far away, but it will come—labor will learn that in normal times there is only one way of raising the standard of living, but one way of increasing the pleasures of life, and that is by harder work, more efficient labor; by increased production per unit of labor.

Australia Seizes Coal

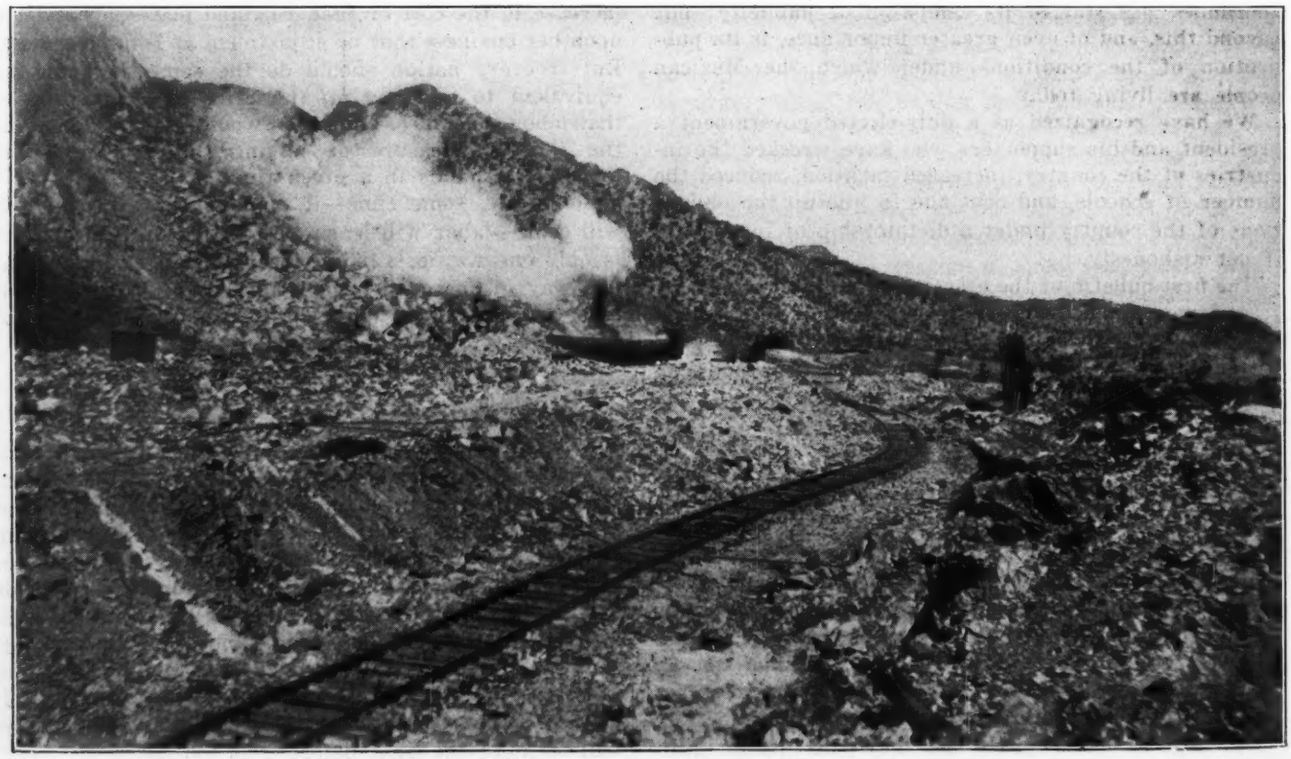
ENGLAND is not alone in her troubles with the coal miners and the production of coal. The Prime Minister of Australia has taken over the output of that commonwealth. It is the intention of the government to fix wages and the conditions of labor, as well as the price of coal. If this results in lowering production and increasing the price of fuel, as has been the case in England, the government will find that it has "fixed" some industries depending upon cheap fuel to an extent that will enable them to do without fuel or labor. It is to be hoped that the Prime Minister and the miners will both see the light before it is too late.



PLANT OF NEW CORNELIA COPPER CO., AJO, ARIZONA

New Cornelia Copper Company

GENERAL VIEW NO. 2 HILL, SHOWING FIRST CUT, NEW CORNELIA COPPER COMPANY



Silver Volatilization in Smelting*

It Is Necessary To Distinguish Between Volatilization and Dusting—Mechanical Loss Due to Ebullition Has Nothing To Do With the Vapor Pressure Or True Volatilization

BY FREDERIC P. DEWEY
Assayer, Bureau of the Mint, Washington, D. C.

MUCH has been written about the Parkes process for desilverizing base bullion with zinc. It is invariably stated that little silver goes over with the zinc in distilling the crusts, or that there is practically no loss of silver in this operation. Diligent search and inquiry failed, however, to disclose more than a single actual determination of silver in the distilled zinc, in one of Raymond's[1] reports. This gives a result of 0.00012%, or 0.035 oz. per ton, a small proportion.

Johnston[2] presents a most interesting and valuable review regarding vapor pressure and volatility of high-boiling-point metals, containing much information and many useful references. He gives the boiling point of zinc as 920° and the vapor pressure of silver as 10^{-3} mm. at this temperature; the boiling point of lead as 1640° and the vapor pressure as 1 mm. at 960°, and the boiling point of silver as 2090°.

Groves and Turner[3] heated gram samples of an alloy of silver and zinc containing 50.46% silver in a vacuum, with the results shown in Table I. In the last test of the

TABLE I. RESULTS OF HEATING SILVER AND ZINC ALLOYS IN A VACUUM

Temperature, Degrees	Time Min.	Residue Weight, Gram	Residue Silver, Per Cent	Residue Zinc, Per Cent
500	45	0.7582	65.86	34.14
500	120	0.7350	68.46	31.54
600	120	0.6052	83.28	16.72
700	120	0.5104	98.68	1.32
1000	30	0.4924	99.33	0.67

series, 99.33% of the zinc volatilized and should have shown 3.13% silver, 912.75 oz. per ton. They also heated a gram of silver-lead alloy, containing 49.60% silver, in a vacuum for two hours at 1000°, and obtained a volatilization of 99.4% of the lead and 8.31% of the silver. The sublimate should have shown 7.61% silver, or 2220 oz. per ton.

Friedrich[4] distilled zincs containing 0.01 to 1% silver at 1165° to 1392° for varying periods of time, the tests being accompanied by checks of pure silver. The actual losses varied from 2.5 to 8.2% of the silver. The net losses, which he regarded as largely mechanical, were from 0.4 to 5.8%. Five checks weighing from 2.5 to 260.45 mg. lost from 2 to 3.4% on heating at 1165° for 30 minutes.

Blakemore[5] gives the following assays of blue powder obtained in distilling crusts carrying 1000 to 2000 oz. silver and several hundred ounces gold per ton—so-called "gold crusts": Silver, 1.18, 6.89, and 20.12 oz.; 2.18, 7.32, and 20.78 oz., and 5.47, 15.32, and 332.21 oz. per ton. He suggests that the high result was caused by bullion getting into the condenser, but Sulman[6] states that melted zinc in the presence of oxygen gives "solid particles" "capable of carrying off finely divided gold," so that the highest result may have been caused by a leaky retort. Excepting the case of the high silver, the gold varied from a trace in three cases up to 2.74 oz. per ton, with 20.78 oz. silver. With the wealth of data in this paper, it is curious that no assays of the distilled zinc are given.

At Lautenthal', in the oxidation of the zinc by steam, the flue dust showed—ZnO, 69.6%; PbO, 28.2%; Ag, 8.8 oz. per ton. In an experimental distillation of cyanide precipitate, Clevenger[8] found 7.2 oz. silver and 0.8 oz. gold per ton. Rose[9] reviews the loss of gold and silver in the volatilization of zinc and adds some tests. H. H. Alexander, superintendent Maurer plant, A. S. & R. Co., kindly supplied seven miscellaneous samples of Parkes zinc, which yielded me the results given in Table II.

TABLE II. ASSAY OF MISCELLANEOUS SAMPLES OF PARKES ZINC

No.	Silver, Oz. per Ton	Gold, Oz. per Ton
1	28.0	0.14
2	33.0	0.17
3	41.0	0.20
4	75.5	0.41
5	77.0	0.29
6	325.0	1.25
7	604.5	2.91

The results shown in Table II are entirely contrary to the book statements. They also indicate wide diversity of conditions in the distilling. It has been suggested that the high results might be due to the use of old retorts for condensers, but only iron condensers were used. Mr. Alexander has reported three inventory assays, which show similar results as follows:

No.	Silver, Oz. per Ton	Gold, Oz. per Ton
1	69	0.26
2	138	1.56
3	325	1.33

Mr. Alexander also sent me two sets of four samples taken during the course of two distillations, which gave the results shown in Table III. E. B. Braden, general

TABLE III. ASSAY OF DISTILLATION SAMPLES OF ZINC

No.	First Set Silver, Oz. per Ton	First Set Gold, Oz. per Ton	Second Set Silver, Oz. per Ton	Second Set Gold, Oz. per Ton
1	22.5	0.12	13.0	0.05
2	10.6	0.03	6.1	0.05+
3	2.5	tr	2.1	tr
4	3.0	0.02—	1.5	tr

manager of the Selby plant of the American Smelters' Security Co., kindly supplied a set of three time samples which showed:

No.	Silver, Oz. per Ton	Gold, Oz. per Ton
1	4.8	0.13
2	1.9	0.07
3	1.3	0.01

These time sets show that it is possible to distill the zinc out of the crusts so that it carries only slight amounts of silver, but the miscellaneous samples show that proper care is not always exercised and much silver

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[1]"Mineral Resources of the United States for 1873"; p. 482.
[2]*Jr. Ind. Eng. Chem.*, Vol. IX, Sept. 1, 1917; p. 873.
[3]*Jr. Chem. Soc.*, Cl., 1912; p. 585.
[4]*Metallurgie*, Vol. V, 1908; p. 594.
[5]*Trans. Aust. Inst. M. E.*, 1898; p. 221.
[6]*Trans. Inst. M. M.*, Vol. XIV, 1904-05; p. 431. See also Sulman and Teed, Jr., *Soc. Chem. Ind.*, Vol. XVI, 1897; pp. 966-7.
[7]"Schnabel's Metallurgy," Translation by H. Louis, Vol. I; p. 552.
[8]*Trans.* A. I. M. E., Vol. XXXIV, 1903; p. 912.
[9]*Trans. Inst. M. M.*, Vol. XIV, 1904-05; p. 392.

may be carried along with the zinc. This is undoubtedly mechanical and has no connection with volatilization. It is caused by excessive ebullition of the zinc in the retort, due to allowing the temperature to rise too high.

In all, I have made eighteen assays of Parkes zinc, and Mr. Alexander has furnished three giving the following silver results, the gold figures being too small to count:

Time Samples, Oz. per Ton	Time Samples, Oz. per Ton	Miscellaneous Samples, Oz. per Ton	Miscellaneous Samples, Oz. per Ton
1.3	4.3	28	138
1.5	6.1	33	325
1.9	10.6	41	325
2.1	13.0	69	604.5
2.5	22.5	75.5	...
3.0	...	77	...

Friedrich[10] reviewed and investigated methods of determining silver in zinc and gave determinations on thirty-one samples of a wide variety of zincs. Two did not show surely detectable silver, two showed 0.000002% silver on 1-kg. samples, seventeen showed less than 0.001%, six showed 0.001 to 0.002% and four showed from 0.00221 to 0.00648%. The most satisfactory way I have found for determining the silver in zinc is to dissolve the zinc in sulphuric acid, filter, scorify the residue and cupel. Many tests on the filtrate failed to show silver on nearly neutralizing the acid and adding a limited amount of sulphureted hydrogen water. Under these conditions some sulphide of zinc will be separated as a perfectly white precipitate, which may be tinged yellow when cadmium is present.

The Alexander crusts run fairly uniformly from 4800 to 5500 oz. doré per ton. The Selby crusts are approximately 5000 oz. per ton, about 50 fine in gold.

I have also determined the lead in the time samples and have figured the parts of lead per part of silver going over with the zinc and have given the results in Table IV.

TABLE IV. PARTS OF LEAD PER UNIT OF SILVER IN ZINC SAMPLES

	Alexander				Selby	
	First Set		Second Set			
No.	Per Cent.	Lead Parts per One Part Silver	Per Cent.	Lead Parts per One Part Silver	Per Cent.	Lead Parts per One Part Silver
1	0.89	11.6	0.96	21.6	0.88	53.5
2	0.88	24.3	0.75	51.2	0.90	138.0
3	0.88	102.8	0.95	130.3	1.24	278.0
4	1.51	147.0	1.30	253.9	....	.....

These results show most emphatically that lead does not promote volatilization of the silver. On the contrary, they demonstrate that the lead protects the silver from the drag of the volatilizing zinc. In distilling zinc out of Parkes crust there appears a complex result, the details of which should be sharply defined. There is, first of all, the straight volatilization of the metals due to vapor pressure. There is the drag of the volatilizing zinc upon the other metals. There is the purely mechanical loss due to excessive ebullition of the charge, and this has nothing to do with the vapor pressure or true volatilization. The drag of the volatilizing zinc must decrease as its proportion decreases and the proportion of silver increases, but this might be overbalanced by the greater vapor pressure arising from an undue increase of temperature. Also, the increase in the proportion of lead in the bath must oppose the drag of the volatilizing zinc. Thus it happens that in the early stages of a properly conducted distillation the zinc carries more silver than at the end.

At various times during the lead determinations the solutions showed the color of iron and No. 3 of the first time set from Mr. Alexander showed 0.4%. In his second set only qualitative tests were made. Iron appeared in every sample, but in widely varying amounts. In the Selby set I found: No. 1, iron 0.55%; No. 2, iron 1.10%; No. 3, iron 0.70%.

The conditions in distilling zinc from ores are markedly different from the crust conditions, particularly in that there is no bath of lead to hold the silver back and there may be dusting. K. Stock, general manager, Bartlesville Zinc Co., has kindly supplied a set of samples made in a test to "produce spelter of the new Government regulations for A-grade out of crude spelter produced from Butte and Callahan ores." The ores were supposed to carry about 20 oz. silver per ton and to require about 2½ tons to produce a ton of spelter. In samples representing the first, second, and third draw spelter from straight Butte ore I found the following:

No.	Silver, Oz. per Ton	Lead, Per Cent.	Parts per One Silver
1	0.164	1.0	1778
2	0.583	1.5	750.5
3	1.178	2.25	557

Though there is an increase in both silver and lead in these samples, the amounts of silver shown are small, and the increases are not proportional. The increase may have been owing to increase in temperature during the distilling. In any event, these figures show that the carrying capacity of the lead for silver must have been low.

Starting with zinc as low in silver as these results indicate, it could not be expected that the redistilled metal would yield definite results. From 101⅜ gm. of R-1, I obtained 0.21 mg. of silver; from 70½ gm. of R-2, the silver bead was not visible to the naked eye; from 75½ gm. of R-6 the bead was just about visible. I did not test any of the other R's for silver. The lead results were: R-1—lead, 0.25%; R-2—lead, 0.08%; R-3—lead, 0.07%; R-4—lead, 0.10%; R-5—lead, 0.07%; R-6—lead, 0.07%. The first sample showed the most lead, and by qualitative tests it showed the most cadmium, as would be expected. I am much indebted to W. R. Ingalls for assistance during the course of this investigation.

Many of the statements of volatilization losses in smelting include the loss by dusting. The necessity of distinguishing between true volatilization and dusting is well shown by a month's record of the commercial cupels at the Balbach S. & R. works (equipped with a Cottrell condenser), as kindly given me by Mr. Dieffenbach. The dust collected showed only 40% of lead, proving that it contained much mechanical dust. This was due to the fact that over 70 tons of rich slimes were treated on the lead bath. The dust collected showed 0.64% of the silver charged and 0.072% of the gold. With so much mechanical dusting of rich stuff, the amount of silver and gold actually volatilized must have been extremely small.

Eilers'[11] exhaustive paper on the baghouse in lead smelting furnishes some pertinent illustrations. The Murray, Utah, plant smelts the ordinary run of silver-lead ores of the West. The charge runs low in both lead (10-12%) and silver. In smelting 254,794 tons, there was collected 0.44%, or 1124 tons of fume, showing only 0.0149 oz. gold and 2.62 oz. silver per ton, or 0.097% gold and 0.085% silver charged. Though it carried only 28.42% lead, or 3160 parts to 1 part silver,

[10] *Zeit. f. Angew. Chem.*, Vol. XVII, 1904; p. 1636-44.

[11] *Trans.* A. I. M. E., Vol. XLIV, 1913; p. 708-35.

it also carried 36.6% arsenic, or 48.3% arsenious oxide. It showed only 2.9% silica, and may be considered as essentially volatilized material. In 4.5 years' run the fume carried 0.049% of the gold charged and 0.063% of the silver. It showed 4401 parts of lead to 1 part of silver.

The blast furnaces at Omaha, Neb., treat various plant products, with some ore. The charge is high in lead, often 40%, and rather low in precious metals. In one year, 74,112 tons yielded 580 tons of fume, carrying 1615 oz. silver, or 2.78 oz. per ton. It showed 230 tons lead, or 4154 parts to 1 part silver.

A complete illustration of volatilization in smelting operations under oxidizing conditions is afforded by the record of the converter baghouse at Omaha. These converters bessemerize leady copper matte, about 90 oz. silver per ton, with various byproducts and ores, to blister copper. The fumes pass through about 1200 ft. of flues to a fan and thence to the bags. Six samples were taken from this flue, generally at 200-ft. intervals, and one sample was taken from the baghouse. The analyses show that, certainly after the first 400 ft., the fume consisted essentially of volatilized material in the form of sulphates and oxides. If both the lead and the combined SO_3 are calculated to lead sulphate, the interesting comparison in Table V is obtained. At first there were other sulphates besides lead, but at the end there was an excess of lead oxide.

TABLE V. DISTRIBUTION OF LEAD SULPHATE IN FLUE

Sulphate of Lead					
	Lead Equivalent,	SO_3 Equivalent,		Lead Equivalent,	SO_3 Equivalent,
Feet	Per Cent.	Per Cent.	Feet	Per Cent.	Per Cent.
200	81.96	95.18	800	94.55	85.60
400	87.82	87.60	1100	92.21	88.36
600	93.97	86.43	1200	94.26	78.02
			Bags	96.60	81.92

That the volatilizing lead exerted little or no drag upon the associated silver is manifest from the following table showing the parts of lead per one part of silver:

Distance, Feet	Parts Lead	Distance, Feet	Parts Lead
200	3889	800	9421
400	5833	1100	8750
600	7802	1200	11739
		Bags	6875

During one year 1551 tons of fume carried 5559.44 oz. silver, or 3.58 oz. per ton. It also carried 1325.387 tons lead, or 85.45%, which would be 6953 parts per 1 part silver. It is essentially an oxide fume, practically free from sulphates.

Fulton[12] gives an analysis of fume showing 40.57% oxide of zinc and 6.7 oz. silver per ton and one with 34.34% arsenious oxide and 5.07 oz. silver per ton. Roesing[13] bessemerized base bullion with 12.4 oz. silver per ton, bringing it up to 196.3 oz. per ton. The fume showed 75% lead and 2.5 oz. silver per ton. The litharge was over 1200° and very fluid. It showed 1.05 oz. silver per ton.

These results confirm my Parkes process figures regarding the slight effect of volatilizing zinc and lead in promoting the co-volatilization of silver. As far as they go, they also indicate that even arsenic has little effect. The effect of arsenic is, however, largely dependent upon the temperature of the operation. I have roasted many charges of rich arsenide ores from Cobalt, Canada, at a very low temperature for the purpose of converting as much as possible of the arsenic into metallic arsenates. With about 40% arsenic and several hundred ounces silver per ton, a little more than half the arsenic remains in the roast. From the furnace to just beyond the fan five samples of the arsenious oxide showed 3.62, 6.18, 6.89, 6.9, and 7.4 oz. silver per ton. Further along, at and in the bag, the arsenious oxide was very white and uncontaminated with dust. Three samples showed 1.69, 2.00, and 2.04 oz. silver per ton. A ton of arsenious oxide represents approximately 6.5 tons of ore.

Wright[14] obtained a base silver, about 800 fine, containing much arsenic, from these ores. On bessemerizing and refining this bullion the impure arsenious oxide produced showed about 800 oz. silver per ton.

[12]Bureau of Mines, *Bull.* 84, 1915; p. 33.

[13]*Eng and Min. Journ.*, Vol. LIII, 1892, p. 431. *B. u.* H. Z. LI, 1892, 102.

Hand Sorting in Idaho

According to a report on mining districts of Idaho recently issued by the Bureau of Mines, hand sorting is practiced to a more or less extent at many of the mines and mills. Where hand sorting is employed and the mill is some distance from the mine, the sorting is usually done at the mine, although at a few places the ore is sorted at the mine and also at the mill. At some of the mills, when the ore is rather coarsely disseminated, both mineral and waste rock are sorted. The quantity of shipping ore thus sorted out, which is known as "crude ore" or "high grade," varies from a few per cent to as high as 60 per cent of the total tonnage of concentrates shipped.

The usual method of procedure in hand sorting is as follows: The oversize passes from the grizzly onto a wide conveyor belt, where the ore is washed with a spray of water, so that the sorters can distinguish the mineral from the waste rock more readily. Men stationed on each side of the conveyor belt sort from the washed material either the mineral or the waste rock and drop it into shoots leading to the respective bins.

A paper on hand sorting of mill feed was presented by R. S. Handy, mill superintendent of the Bunker Hill & Sullivan Co., Kellogg, Idaho, at the meeting of the Columbia Section of the American Institute of Mining and Metallurgical Engineers, held at Kellogg, on Nov. 17, 1917. This paper was most interesting and instructive, as was the discussion that followed. Mr. Handy claimed that hand sorting of the mill feed is not necessary, and that it is cheaper, in fact, to treat the mill feed direct, without previous hand sorting. There seems to be no question that Mr. Handy, who has made careful study of the treatment of the Bunker Hill ore, is correct in assuming that for this particular ore and under the conditions in the mill it is best to treat the mill feed direct without hand sorting. Whether, under different conditions, hand sorting is essential or not should be determined for each individual ore.

Screen Sizing at Anaconda is done entirely in the coarse-crushing and concentrating division of the copper concentrator at the Washoe Reduction Works, primarily to secure a product of the required size, with a minimum amount of slime and with as much as possible of the valuable mineral liberated for recovery by gravity concentration. At the zinc concentrator no gravity concentration methods are in use. The screening, however, is conducted as at the copper plant, producing a 1½ to 2 mm. feed for the ball mills. The screens used are revolving trommels 3 by 6 ft. with 1 in., ⅜ in. and 4 mm. round holes and 1½ by 12 mm. slotted holes. All screens are steel. No screens finer than 1½ by 12 mm. are used.

[14]*Eng. and Min. Journ.*, Vol. CVII, p. 263, from *Trans.* Can. Min. Inst., 1918; p. 992.

Placer Mining in Oregon

Hydraulic Elevators Which Have a Lift of 89 Feet Will Be Replaced by a Water Classifier That Requires Driving a 700-Foot Tunnel—Operating Costs Will Be Reduced

BY A. E. KELLOGG
Gold Hill, Oregon

THE original "old channel," or bed of the ancient river, the dream of which has caused many a weary Oregon prospector to renew the search, has recently been uncovered at the Esterly mine, situated in the Waldo district, in the southwest part of Josephine County. A pit 25 ft. below the level of the former workings has been piped, and operations have opened up a bed of gravel that shows a different character from the clay banks which have proved so profitable during the last fifty years of active operation of the mine. The extent of the new deposit has not yet been determined, as no exploration has been done at this particular place, although many prospect shafts were sunk during a preliminary investigation. No clean-up has yet been made on which it is possible to base an estimate of the gold contained in the ground, but sufficient panning has been done to demonstrate the presence of much coarse gold. Heretofore the gold secured from the ground covering this deposit has been fine, and flour gold was found to be evenly distributed through the clay banks, which range from 15 to 35 ft. in depth. These deposits, according to Kay,[1] have averaged about 12½c. in gold per cu.yd., and contain some platinum.

The Esterly property, combining the old Logan, Simmons and Cameron placers, has been a profitable producer for more than fifty years. It now consists of 4200 acres, practically all of which is payable ground. The water rights attached to the property consist of a flow of 14,000 miners' inches, water being supplied by a system of ditches that total twenty-five miles in length. The property was purchased for $140,000 in 1916, from James Logan, who successfully operated it for many years, by the Waldo Corporation, of Seattle, Wash., George M. Esterly is manager and superintendent. According to mint shipments, the annual output of the mine for the last three years has averaged $45,000 in gold dust and $10,000 in platinum.

ESTERLY PLACER MINE, JOSEPHINE COUNTY, OREGON
Showing pit, hydraulic giant in operation, elevators, and tailing flumes

HYDRAULIC ELEVATORS TO BE REPLACED BY WATER CLASSIFIERS

A hydraulic elevator system has been erected to provide sufficient grade for the disposal of tailings, which are lifted by two elevators a distance of 73 ft. A recent erection of a third elevator has increased the lift to 89 ft. above the pit opened up on the new deposit. All standard placer gold-saving devices are in use, although owing to the flour-fineness of the gold, a considerable amount is lost in the tailing. Mr. Esterly is

[1] "Oregon Bureau of Mines 1916 Handbook," p. 143.

planning the construction this season of a "water classifier," his own invention, which he is confident will recover 90% of the mineral values. He also purposes to do away with the elevator system by building a race to the Illinois River. This plan will require a 700-ft. tunnel through serpentine, which will cost between $40,000 and $50,000. The new system of operating, when completed, will release for actual mining a volume of water several times that which is now being used to mine a daily output of 1000 cu.yd. at a cost of about 6c. per yard, and will reduce the cost of mining to ½c. per yard. The lighting equipment for night operation consists of a battery of nine 2000-c.p. searchlights and many 1000-c.p. tower lights.

The Waldo district is about twenty-five miles long in an east and west direction and fifteen miles wide. It is a region of rugged mountains, except on the western border, where the Illinois River valley is rather flat. The valley, an excellent agricultural land, varies in elevation from 1400 ft. to 1700 ft., and the mountains are from 4000 ft. to 6000 ft. in height. The area is heavily timbered, especially at the higher elevations, and forms a part of the Siskiyou National Forest Reserve. The nearest shipping point is Grants Pass, about forty miles distant, although a fourteen-mile branch railway now extends toward the district from Grants Pass.

Geology of the Waldo District

The rocks of the district are chiefly sedimentary, including argillites, quartzites, and limestone, and dark-colored sub-siliceous igneous rocks, including andesite, serpentine, auganite, and pyroxenite. Smaller areas of other rocks are known, such as Cretaceous gravels and sands. The oldest rocks are the Paleozoic argillites and limestones, which occupy much of the mountainous part, not only that drained westward to the Illinois River, but also that drained eastward to the Applegate River. In general, these rocks strike northeast and dip steeply eastward. They are interbedded with andesite greenstone in many places, and are overturned so that the oldest beds of the series are on the eastern border lying above the younger beds to the westward. The entire Paleozoic series lies above the still younger Galice formation of the Jurassic period near Waldo and Kirby.

According to Diller,[2] the overlying position of the Paleozoic rocks is due to faulting in this locality. Andesite and basic igneous rocks largely altered to serpentine are associated with the argillites of the Galice formation. Near Waldo there is still a small area of Cretaceous gravels and conglomerate, which has served as a source of placer gold. This lies unconformably above the Jurassic argillites. The latter are steeply inclined to the east, whereas the Cretaceous gravels are nearly flat. On the basis of fossils, these have been referred to the Horsetown formation of the Lower Cretaceous or Comanchean. It is probably that these gravels were formerly much more widespread in this region than they are at present.

The youngest rocks in the Waldo district are the alluvial gravels, which are still being formed by existing streams. In the mountainous part of the district they are confined to narrow strips along the watercourses, but in the Illinois River valley, near the Esterly mine, they are more extensive.

The mineral resources of the district include copper, gold, silver, chromium, platinum, manganese, and limestone. Gold and silver deposits occur both as placer and metalliferous quartz veins. The placer deposits have been worked successfully for more than sixty years and are still far from exhausted. During the war considerable copper and chrome were shipped from the district.

[2] "Oregon Bureau of Mines 1916 Handbook," p. 291.

Packing Goods for Shipment To South America

Insufficient and insecure packing of goods which are shipped to South America by American manufacturers has been the subject of frequent criticism. Shipments of machinery are often too lightly packed, the shipping cases or crates are smashed in transit, and considerable damage is inevitable. All machinery consigned to South American countries should be heavily boxed. Small pieces should not be tied to larger pieces in the same crate, but should be securely boxed and shipped separately. All shippers should assume that their packing cases and crates will receive rough usage in transit in South American countries, and such cases should be designed accordingly. An American consular agent in South America, in writing to the Guaranty Trust Co. of New York, calls particular attention to this fault of American shippers.

Vulcan Steel Products Co. Awarded Huge Contract Abroad

A contract involving a quarter billion dollars for rebuilding the devastated area in the Nancy district of France has been signed by the Vulcan Steel Products Co., of New York. Associated with the Vulcan company in the enterprise are two large contracting concerns, the McClintic-Marshall Construction Co. and MacArthur Brothers Co. Negotiations have been in progress ever since the signing of the armistice between Rodney D. Chipp, general manager of the Vulcan company, and the Committee of Nancy. The $250,000,000 figure appears in the contract, but it is estimated that before the work is completed half a billion dollars will have been spent. The contract was signed some time ago, but actual work has awaited the peace treaty. One of the largest stockholders, who is also a director, in the Vulcan Steel Products Co. is T. Coleman du Pont.

Manganese Ore in India

At a recent meeting of manganese-mining companies, according to the *Journal of the Society of Chemical Industry*, of May 15, 1919, the position of manganese ore in India was described by Sir Thomas Birkett. During the last year the mining industry experienced all the disadvantages arising out of war conditions, and consequently production was considerably restricted. New ore formations have been found at the principal mines, but the cost of working has risen considerably, owing to increased wages.

India has now to be prepared for a serious contingency. The Caucasus mines will again reopen, and there are other mines in Egypt and Africa which threaten formidable competition. Egyptian and African deposits are more favorably situated than those in India for putting manganese ore on the European market, and unless the government helps the industry by various concessions in regard to transport, it has a gloomy future.

Ancient Tin Mining in South Africa*

Mines Are in Waterberg District, About Forty Miles West of the Pretoria-Pietersburg Railway —The Ore, Cassiterite, Occurs in Well-Defined Lodes In Quartzite and Sandstone

WHERE in the course of their prospecting the ancients came upon rich ore, they followed it down until beaten by water or the rock became too hard to treat. Where ore occurred in pockets, flats, or pipes it was followed and taken out with a cleanness which is truly astonishing. Generally speaking, the ancients mined so thoroughly, and left so little behind them, that in one instance the occurrence of ore left in place is very interesting. The old miners must have been disturbed and left suddenly—either a raid occurred or the entrance may have fallen in—otherwise they would not have abandoned such a large number of stone hammers, nor would they have left the working unfilled and a face of good ore for their modern successors, who have taken from the deposit approximately seventy tons of ore containing 7 per cent metallic tin.

Ancient Methods of Breaking Ground

The ore was broken or chipped away with hammer and gad. The gads were of steel, roughly rectangular in section 1¼ by ¾ in. and 12 in. to 18 in. over all, made in one continuous taper from the head to a fine point. The metal was of extremely fine quality, being a mild steel of exceptional purity, equal in quality to the best Swedish iron. The following is an analysis: Silicon, 0.17; sulphur, 0.01; phosphorus, trace; manganese, nil; combined carbon, 0.35 per cent.

The hammers employed by the primitive miners were of stone and roughly spherical in shape, in diameter from 3 to 5 in., and weighing between 3 and 6 lb. They are the hard unweathered round lumps which remain as a result of the spheroidal weathering of diabase. The majority of the hammers probably came from the farm Onverwacht [in South Africa] where a diabase dike outcrops. A few of the hammers are of hard felsite, of which many small dikes traverse the area under discussion. The hammers appear to have been held in the hand, and no handle was used. Many hammers have had a deep concentric groove cut round a mid-circumference, due to the constant tapping on the head of the gad. That fairly effective work could be done with a stone hammer was shown by a hammer boy at Rooiberg, who collared and drilled, with a set of modern steel drills and a handleless stone hammer, a hole 36 in. deep in ground in which over the same drilling period, but using a 4-lb. hammer, he could put in a 54-in. hole.

Where the ground was too hard to break with hammer and gad, the method of fire-setting was employed, a process which was used as recently as forty years ago in Norway. On the "H" lode at Rooiberg a pile of wood ready for fire-setting was found in the face of a flat, elongated, old working. The wood was about 4 ft. long and 4 in. to 5 in. in diameter, stacked near the face in a roughly conical pile. It had been such a length of time in the air-tight working that when touched it crumbled to an impalpable powder. In addition to the small hammers, occasionally very large hammers or mullers were discovered. These were used either to break up large lumps, the result of fire-setting, or to grind to a powder the broken ore before transport to the surface. One such stone was quite smooth, roughly oval in shape, and measured 9 in. in diameter at a mid-section, 14 in. across its longest axis and weighed 70 lb. It was found lying in one of several artificial dish-shaped depressions which covered the floor of a horizontal pocket, where grinding had evidently been done underground.

Most of the ancient workings were filled in before being abandoned. This is also a Rhodesian experience, and the reason for doing so is hard to conceive, but probably it was a superstitious or religious one. The other explanation advanced by some, that the filling-up was to hide the existence of a mine, seems to the writer out of court in an area like Rooiberg, where the small mines were as thick as diggers' claims on the river diggings: more particularly as no working was filled up until (except in a few cases) it had been scraped bare of all payable ore. Particularly at Leeuwpoort have the workings been most carefully filled in with a mixture of rubble, broken waste and surface soil. The remarkable feature at Leeuwpoort is that the ancients have left no other records of any kind. Not a gad nor a hammer has been found in any working, nor are there any traces at surface of smelting operations. The principal old workings there are over the so-called "H. G." section.

None of the old workings at Leeuwpoort is deeper than 40 ft., and they have been broken into at several points from the modern chambers below. There is no apparent reason why the ancients should have stopped at that depth. The tin is found here in a very wide kaolinized body, which is quite soft. Nor could water have been the cause of abandonment, for the present mine, 300 ft. deep, can be kept dry with a skip only. There is every evidence that the ancients must have mined a considerable tonnage, apart from the fact that the Leeuwpoort company has extracted 80,000 tons of ore between the ancients' lowest limit and the modern 100-ft. level.

Manner of Stoping and Timbering

As a variant of the total fill-in method was one used on the Empire lode at Rooiberg. Here the lower section of a stope was found open. About half way up the stope, which was narrow, stull pieces 18 in. to 24 in. long were wedged between foot and hanging wall, and these were lagged over with rough bush timber and the stope was filled in on top of the lagging with the usual mixture of rubble, broken waste, and sand.

Another well-known mining practice was followed at Weynek. Here the tin occurs in soft clayey interbedded lodes dipping 10 deg. west, and varying in thickness from a few inches up to 4 ft. The majority of the stopes do not go down more than 50 ft., but the principal one followed the lode to a depth of 120 ft. on the dip. The stope had been started as an open cast with a width of about 20 ft. along the strike. It then bellied out below to a maximum width of 50 ft. on the strike, coming

*Excerpt from an article by Max Bauman in the *Journal* of the Chemical, Metallurgical, and Mining Society of South Africa, February, 1919.

down at the bottom to 15 ft. The average width of the stope was 30 in., but at places this narrowed down to 10 in. (actually measured). At that flat dip and narrow width no full-sized man could work, and the actual ore breaking must have been done by small boys or by an undersized race like the Bushmen. This stope is of particular interest from the fact that a number of pillars were left in it, not, as might have been supposed, to support the hanging, but simply because the mineral sought was not present in the ore. In addition to following the ore down from the surface by small shafts or open casts, there is an instance at Weynek of a working having been entered by an adit at right angles to the strike of the lode.

The longest continuous ancient working is that on the South End lode at Rooiberg. Here the ancients stripped the outcrop from the surface to a depth varying from 15 to 27 ft. over a length of 620 ft. on the strike. The average width on the top of the cleaned-out workings was 20 ft., which narrowed down considerably at the bottom. Modern work below that of the ancients has shown the existence of a narrow but rich lode. Of sampled development, 450 ft. gave an average of 11.4 per cent metallic tin over 7 in. Over a stoping width of 30 in., and at the present price of tin (£220), this is equivalent to over 80s. per ton mined. The probability is that the ore at surface was much richer, and, judging by the width of the workings, the deposit was also considerably wider. Much of the stoped-out lode had been filled in as usual. There was evidence of the filling having been done in two distinct periods. At one spot, where the working was being bottomed and the filling had been cut through from top to bottom, it was observed that there was a layer, several feet in thickness, of sharp broken waste and rubble at the bottom. This was covered by a layer of surface sand about 2 ft. thick; above this was another layer of waste and rubble, and covering this to normal ground level was a top layer of surface sand. The intermediate sand layer was not uniform throughout, but was made up of a succession of laminæ of light and dark-colored sand, each lamina probably representing the washings over one rainy season, and the number of laminæ indicating a considerable number of years occupied by the washing-in process.

The working clearly showed an early period of mining, then a long interval of abandonment, followed by a second period of mining, and final abandonment. From the appearance of some of the relics found here, some of the work must have been of comparatively recent date. On a ledge, and hidden away after the manner of the modern native, was found a gad, a stone hammer, a knobkerrie, and an adze with a handle. The adze was 12 in. long, with a 5-in. cutting edge set at right angles to the plane of the handle. It ended in a tapered shank which fitted into a tapered hole in the handle—a method of fastening which today is still being used for native axes.

LIGHTING

The question of underground illumination has an important bearing on the subject of the age of these workings. The working in one case is open to daylight, and the afternoon sun shines right into the toe of the stope. It was therefore probably worked throughout without artificial illumination. In the case of the narrow and low pockets in another stope, however, it was impossible for the old miners to have done the careful and clean work which they did without some kind of artificial light.

Dr. Theal points out that the Bantu have no lamps, and R. N. Hall infers from this that the ancient miners of Rhodesia could not have been Bantu. But, on the other hand, no remains of anything resembling a lamp has been found locally. It is possible that the darker workings were mined in earlier times by a people who were acquainted with an artificial light, and that intricate workings were worked in more recent times. One working is extensive, and, unlike most other workings, was never filled in by the old miners. As it lies in the bed of a storm water course, it became filled up with clean water-borne sand, probably in the space of a few years. It was holed into by chance at its deepest point, 55 ft. below the surface, by a modern drive. The working was cleaned out in the hope of finding ore left in place, but with disappointing results. At the bottom a tree was found 6 in. in diameter at base and about 14 ft. long, with the branches hacked off about a foot from the stem, and which had evidently been used as a primitive ladder. The wood is said to be what is locally called Olievenhout, and was in a good state of preservation. Further, about 50 ft. down, an earthenware pot was found, which was still soot-encrusted. It is almost spherical in shape, 7 in. in diameter and 5 in. deep, of fairly coarse texture and resembles in all respects a modern Basuto cooking pot.

The broken ore was probably carried to the surface in baskets or grass bags, the material of which is so perishable that no remains have been found. It is possible, too, as a good many earthenware pots have been discovered, that these were also used for transport. The largest pot discovered was almost spherical in shape, 16 in. diameter and 14 in. deep, and holding about seven gallons. Mention has already been made of the discovery of a crude ladder, and in an old working on the Empire lode, at Rooiberg, a number of steps or footholds can be seen which have been cut out from top to bottom of the soft foot wall of the working, dipping at 75 deg.

METALLURGICAL

Some of the ore was probably ground to powder underground, though the greater quantity was reduced to that state at surface, as is proved by the large number of mullers and grinding stones found everywhere. In the course of trenching, broken ore has frequently been found a few feet below the surface, evidently having been dropped while it was being transported. As these odd pieces have almost invariably been of extreme richness, one is forced to the conclusion that the ancients worked only ore of high tin content.

The ore, after being reduced to powder, was washed either in flat dishes of earthenware, closely woven baskets or perhaps by some method of calabashing, as in Nigeria. The spruit running through the Rooiberg property was probably the principal scene of these washing operations, but in one case they appear to have used an old working as a slime pit. This was an ancient open-cast on the Empire lode, at Rooiberg, roughly rectangular in shape, 45 ft. long by 20 ft. wide at top, narrowing down to 4 ft. at a depth of 15 ft. The material in this pit was unmistakably slime tailing, being much finer than the surrounding reddish surface sand and was arranged in alternating light and dark layers which dipped at 15 deg. The slime assayed 1.2

per cent metallic tin, and about 200 tons was excavated and treated in the modern mill.

All the ore mined by the ancients came from near the surface, and would contain little or no sulphide. By panning, the lighter tourmaline, gangue, carbonates of copper, and oxides of iron would be easily removed, leaving a concentrate of perhaps 70 per cent metallic tin. The concentrate was probably not calcined, for an ingot of bronze found contained 2 per cent of arsenic, and several tin ingots discovered were very impure.

Smelting

The principal center of smelting appears to have been an outlier to the Elandsberg Range, known as Smelters Kop. The kop is a steep, fairly flat-topped hill about 1½ miles from the Rooiberg mine. The edge of the plateau on top is guarded by the usual rough Basuto stone schanzes, such as may be found anywhere in the Transvaal. Scattered over the top are many small slag heaps—some of the slag containing considerable sized beads of tin—and innumerable broken pieces of coarse earthenware. These are the remains of crucibles and tuyères used by the ancients.

It is much to be deplored that in the early days of modern mining here, the value of Smelters Kop as a record of the past was not recognized and that no attempt was made properly to investigate the smelting site. A decade of picnicking has done much to obliterate any evidence which could have been scientifically recorded. It is impossible therefore to reconstruct the ancient smelting furnaces, which were probably blast furnaces similar to the primitive kind formerly used in the Straits by Chinese. The blast may have been produced after the Bantu manner, with two skin sacks, or after the Chinese manner, with a hollowed-out tree, with piston and long piston rod.

Apart from Smelters Kop, numerous smelting sites, with their remains of slag and broken nozzles, are to be found on Olievenbosch, Haartebeestfontein, Weynek, and Blaauwbank. On the latter farm a most interesting ancient furnace bottom was discovered. It was a circular ring of hard-baked clay, about 2 ft. in diameter and 1½ in. higher than the ground around it. In the sand on the outside of it was found an unformed lump or ingot of bronze, evidently the result of an overflow of molten metal through a crack in the bottom of the furnace. The composition of the ingot was as follows, the figures being approximate only: Cu, 80 per cent; Fe and Al, 5; Ni, 3; Sn, 7; As, 2; gangue, 3 per cent.

The presence of arsenic may be due to non-calcination of the tin concentrate used; but the nickel content is rather remarkable. It is interesting to note that this farm Blaauwbank, where the ingot was found, is one of the few places in South Africa where nickel is known to occur. On the western boundary of Haartebeestfontein small heaps of slag have recently been discovered containing 30 to 35 per cent of oxide of tungsten and 2½ per cent of metallic tin.

Historical

Who were the ancient miners, and when did they work here? The presence of underground timber in a good state of preservation, the comparatively small size of trees growing in some of the large workings, and the finds of crude earthenware pots and implements pointing to a race resembling and no further advanced than present-day Basutos, all tend to show that some of the workings are of recent date. Confirmation of this could be deduced from the following:

In 1723 Jan v. d. Capelle, an official of the Dutch East India Co. at Delagoa Bay, reported to the Governor and Council of the Policy at the Cape: "At the end of the year just passed natives have been at La Goa from the countries 'Paraotte' and 'Machicosje,' who not only brought copper but also tin for purposes of barter. The copper was of very fine color. The tin was of medium good color, but somewhat brittle and light, as may be seen from two samples of staves (bars or ingots). One of these is much harder than the other, as would happen if remelted. They state that the tin was found on the banks of a river in the country 'Machicosje,' is gathered in baskets, cleaned of sand, and then smelted to bars for the purpose of barter. All the inland dwellers use this tin (also such as they buy from us), which they alloy with copper for the purpose of making necklets and bracelets. That is, no doubt, the reason why their ornaments have such a high polish and are more pliable than those of the company."

Nine years later this same van de Capelle reported to the Cape that he had purchased 56 bars of tin from natives at Delagoa. Now, Rooiberg is only 260 miles due west of Delagoa Bay, and it is a fair inference to assume that these bars came from Rooiberg or its neighborhood. Dr. Moffat mentions that as late as 1826 he came across a Mohurutsi coppersmith near the Molopo who could smelt bronze, and with a draw plate drew his own copper or bronze wires for making bracelets. All this would point to the modern date of the workings under discussion by people of Bantu stock, either Basuto or Bapedi.

Former Production

A careful estimate—though only an approximation, of course—shows that 18,000 tons of ore was taken from the Rooiberg area alone. The small lots of broken ore occasionally found indicate that the old workers smelted only ore high in tin content. Their tailings contained over 1 per cent metallic tin, and their average recovery was probably not less than 5 per cent metallic tin. Thus, 18,000 tons at 5 per cent metallic tin would give a recovery of 900 tons, or, say in round figures, 1,000 tons of metal. Judging by analogy, it is fair to assume that from Weynek, Leeuwpoort, and contiguous territory a further 1,000 tons was recovered, or an output of 2,000 tons from this whole area. The greater part of this would be turned into bronze. Assuming that the average alloy had the tin content of the locally found bronze, 7 per cent metallic tin, the 2,000 tons of tin expressed as bronze would amount to, roughly, 30,000 tons. What became of this 60,000,000 lb. of bronze? The Bantu in the 1,000 years since they crossed the Zambesi could not have used up that quantity for bracelets and necklets only.

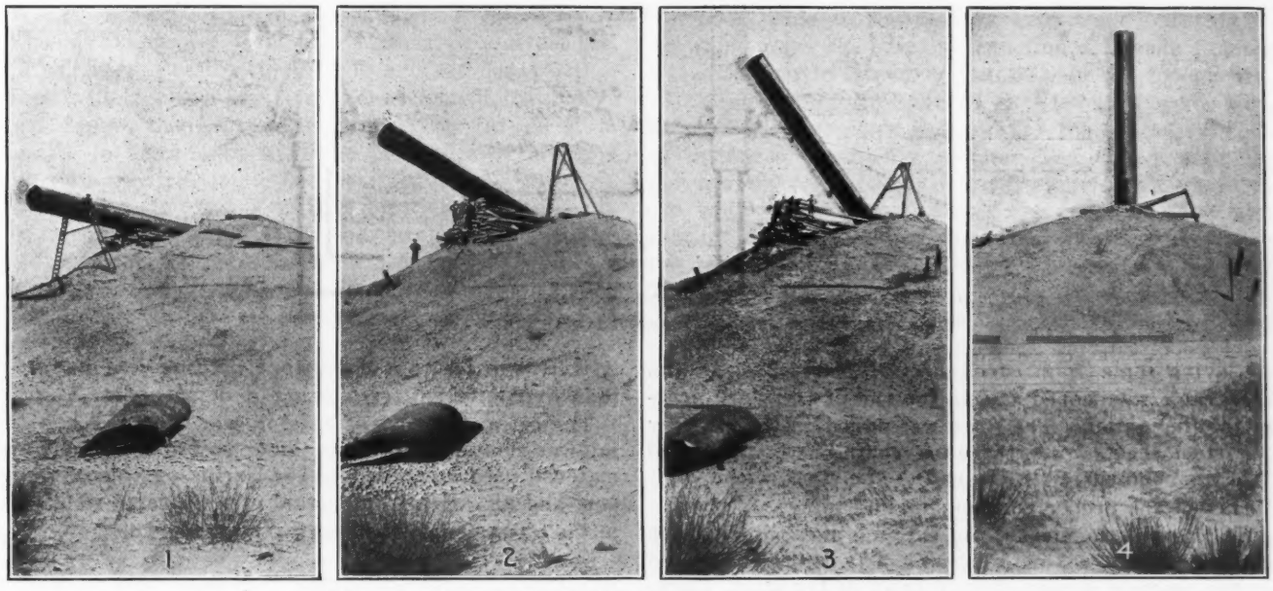
It is, therefore, necessary to conclude that the mining, though some of it is recent, extended over a much longer period than 1,000 years, and that a large portion of the bronze was not absorbed by South Africa, but was exported. There must therefore have been some remote period when these mines were opened up and the product was smelted and utilized by an ancient civilized race of traders. In fact the available evidence correlates the ancient tin miners with the ancient gold miners of Rhodesia.

Solving a Stack-Raising Problem

Thrown Fifty Feet From Its Foundation by a Windstorm, a Smeltery Stack Was Re-erected And Established in Final Position at Considerably Less Than Estimated Cost

BY MARTIN FISHBACK
Mining Engineer, Benson, Arizona

IN REMODELING a copper-smelting plant at Benson, Ariz., one of the problems to be solved was the replacing of a stack 6 ft. in diameter, 75 ft. long, made of ¼-in. steel plates, originally put up in sections and placed on top of a small hill, where a shaft 30 ft. deep connected with a 200-ft. tunnel leading from the dust chamber. The stack was originally placed on top of a concrete foundation, but not anchored or supported except by guy wires. A short time before the present owners took over the plant, the stack, which, like all other smelting equipment on the property, was new and had never been used, was torn from its moorings during a heavy windstorm, and thrown down the hill about 50 ft. from its foundation. The extreme top-end of the stack, which, of course, hit the ground the hardest, was flattened out. By sacrificing a section of this part of the stack, the remainder of the flattened portion was forced back into shape by jackscrews, and then held there by placing two "sprags" of 3-in. steel pipe, 6 ft. long. The jacks were then removed. That completed the repair work on the stack itself.



STAGES IN THE RE-ERECTION OF A SMELTERY STACK

The next step was to carry the stack up the hill and place it where it belonged. Its weight was approximately 14,000 lb. The power-plant at the smeltery was undergoing repair and overhauling, and it was necessary to replace the stack entirely by hand. To "snake" it up the hill 50 ft., on an incline of 30°, and then up-end it and put it back into place did not appear to be an easy job with the equipment available. The method finally worked out and adopted, however, proved efficacious and economical, and will be described for the benefit of those who may have to solve a similar problem.

There were at hand four heavy timbers, each 12 x 20 in. x 32 ft. long, each timber weighing about 2000 lb. Two of these were "snaked" to the top of the hill, and one was placed on each side of the old concrete foundation, 14 ft. apart and parallel to the direction in which the stack had to be moved. The other two timbers of similar dimensions were placed about 30 ft. down the hill, opposite to the side on which the stack was lying, and were to serve as the "dead man," or pulling point. The timbers were placed as shown on the side elevation in the accompanying cut, the ends toward the direction of pull being notched into the hillside about 1 ft., and the pulling point established 10 ft. from this end. This left 22 ft. as "cantilever weight" of both the two timbers, which was several times more than sufficient to sustain the weight of the stack to be lifted. No further tying down was required.

The two timbers placed on top of the hill were tied together and braced on the side next the "dead man," to prevent side slipping and spreading. The front or side next the stack had to be left open for the path of the stack when raised. A two-legged derrick, or bipod, made of 8 x 8 in. Oregon pine, 22 ft. long, as shown, was securely reinforced with heavy iron straps, and hinged or pivoted on the two heavy timbers; this was accomplished by bolting heavy 1-in. iron on the bottom ends of the bipod, and chiseling out a groove 8 in. deep and 1½ ft. long in the timbers, allowing free movements of the hinges. A 2-in. hole was bored horizontally through the timbers, intersecting the groove, and drilled into the old concrete foundation to a distance of about 8 in. The bipod was then raised with the iron loops in their position in the grooves, and a 2-in. iron bolt or pin driven through the timbers and iron loops, and into the concrete. The bipod was thus se-

curely hinged and had free play. Driving the iron pins into the old concrete prevented any movement of the large timbers, and the hoisting apparatus was ready.

While the gear was being assembled an open cut was excavated between the timbers on the side facing the stack, in order to place the base of the stack 10 ft. below the top of the old foundation, in its former position. This necessitated blasting out enough of the old concrete on that side to allow the stack to pass through and within the old concrete walls. A solid foundation for the new position of the stack had already been provided by a system of square sets constructed of reinforced concrete from the bottom of the shaft to the new foundation of the stack. The stack was then rolled around on the hillside by the cant-hook method (with chains and 3-in. steel pipes) until it was in direct line with the open cut and for a straight pull to its new position. A skidway was then provided by laying some $\frac{3}{16}$-in. steel sheets in position. A $\frac{1}{2}$-in. steel cable was looped around the end of the stack nearer the foundation. The stack was pulled up the hill over the steel sheets by a three-ton chain-block, and eased into the open cut, with the end of the stack within two inches of the proper position for up-ending.

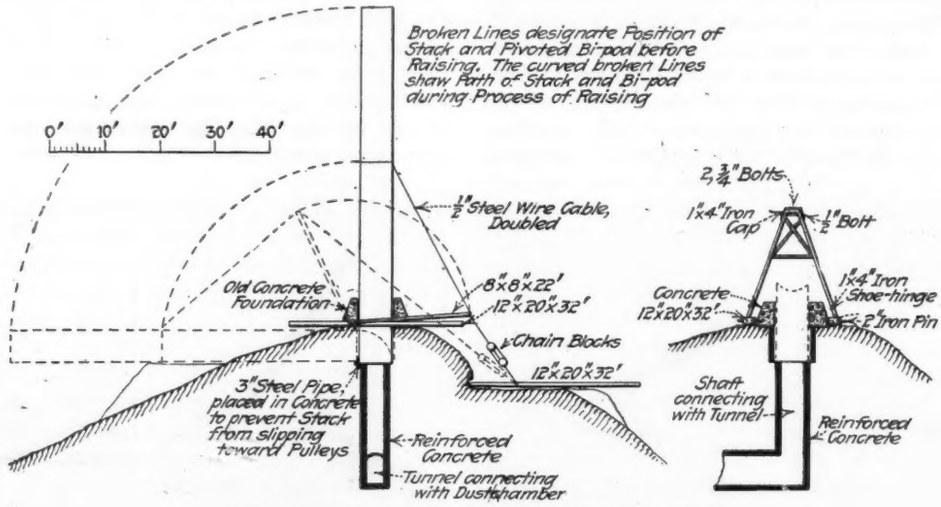
To prevent the stack from slipping ahead during the raising process, a 3-in. steel pipe, 4 ft. long, was placed in the concrete immediately in front of the stack, allowing a few inches to extend above the rim. The other end of the stack was then raised up with jackscrews and supported with blocks and timbers, placing the stack in a horizontal position. While in this position about 40 ft. of the top end of the stack was painted.

A $\frac{1}{2}$-in. steel cable was then looped around the stack three times, 30 ft. from the top end, and held in position and kept from slipping by lugs bolted to the stack. The two cable ends were then looped around the top of the bipod and securely fixed with cable clamps. The angle of the bipod inclining over the stack at this stage was 65°, or, in other words, this was the angle intercepted between it and the stack. The distance, or length, of the fixed cable between the stack and bipod was 32 ft. From the bipod the two cable ends were then carried down to chain blocks hooked to the "dead man." One cable was double-looped around the chain-blocks hook and returned up toward the top of the bipod, where it was connected with the twin cable with cable clamps. The other cable end was arranged in a similar manner and attached to another set of chain-blocks; and by this system each of the two chain blocks worked independently, and permitted the shortening of the cable for a new pull when the limit of each chain-block had been reached about every 10 ft. of pull. The total distance of pull was approximately 40 ft., which necessitated a shortening of the cables four times before the stack was in position.

The maximum load to be lifted was, of course, at the beginning. For the first 10 ft. of pull the chain blocks were assisted by jackscrews and supported by following up with cribbing, as shown in the halftone. From there on the stack was raised exclusively with the chain-blocks, as described.

When placed in its final position, a collar of reinforced concrete, from its new base to the top of the old foundation, was poured around the stack. No guy wires are required. The stack is firmly planted, and it is reasonable to assume that nothing less powerful than dynamite will ever bring it down again.

The estimated cost of raising was $500. When the job was completed, the total labor cost was $315.59, and material used amounted to $54, including concrete support and all. Hence the actual expense came well within the estimated cost of solving the problem.


Broken Lines designate Position of Stack and Pivoted Bi-pod before Raising. The curved broken Lines show Path of Stack and Bi-pod during Process of Raising
0' 10' 20' 30' 40'
½" Steel Wire Cable, Doubled
Old Concrete Foundation
8"x8"x22'
12"x20"x32'
Chain Blocks
12"x20"x32'
3" Steel Pipe, placed in Concrete to prevent Stack from slipping toward Pulleys
Reinforced Concrete
Tunnel connecting with Dust Chamber
2, ¾" Bolts
1"x4" Iron Cap
½" Bolt
1"x4" Iron Shoe-hinge
Concrete 12"x20"x32'
2" Iron Pin
Shaft connecting with Tunnel
Reinforced Concrete

DETAILS OF EQUIPMENT FOR RAISING STACK

Workmen's Compensation

Employers Should Study the Law of the States in Which They Operate and Legal Decisions and Departmental Rulings

BY CHESLA C. SHERLOCK

NO EMPLOYER, engaged in a specialized avocation, can have more than a hazy conception of the workmen's compensation acts until he comes to study them in connection with his own trade or industry. It is then only that he can have some measure of comprehension as to just how these acts affect his business. This does not mean that employers are generally uncertain as to the law, but it does mean that the average statute is so worded as to be obscure to everyone until the courts have interpreted the details in the light of actual cases arising within the various trades and callings.

Mining is certainly a specialized industry, and it is an extra-hazardous one. It is so unusual, as far as risk is concerned, that many of the states have enacted laws specifically applying to the mining business. For instance, the Alaska Compensation Act operates upon the mining industry entirely. One employer raised the point that, as this act applied to only one industry, it was class legislation and therefore unconstitutional. The Federal court (Johston *vs.* Kennecott Copper Co., *248 Fed. 407, p. 413*) said that the classification of subjects for regulation by law was a function of the legislative branch of the Government; and that, though class legislation is generally prohibited, if the application is limited, and it affects all alike that are within its sphere, it is not within the prohibition. The compensation act of Alaska, although applied to the mining industry alone, affected everyone engaged in mining, even though remotely, and it was not unconstitutional upon this ground. The act was to include "mining operations," which was sufficiently broad to include everyone in the industry, in the opinion of the court.

In determining the interpretation of an ambiguous statute which is capable of two or more constructions, the Utah court (Ind. Com. *vs.* Daly Min. Co., *172 Pac. 301, p. 306)* held that the court must take into consideration the object the Legislature had in enacting the law. If it be possible to give the act a construction which would render it largely ineffective and useless, and, likewise, possible to give it another construction which will make it effective and of benefit, the court must follow the latter construction, so far as it is possible in accordance with the principles of law and statutory construction. The basis of the payment of compensation is often a serious question for employers to determine, especially when they are engaged in mining operations. Compensation acts usually provide that the workman shall be compensated in accordance with the average weekly wage he has earned for the year preceding the date of injury.

In those not infrequent instances in which the workman changes his employment several times within the year, or changes his grade within the same employment, employers are naturally anxious to know just what his measure of compensation is. This is a difficult question, especially if the earnings of the employee have been irregular and hard to ascertain. In Kansas, however, it was held (Bundy *vs.* Petroleum Products Co., *172 Pac. 1020, p. 1021*) that the employee is entitled to compensation based upon his earnings or those of other persons in the same grade of service, although the injury had been received when he was employed in a different grade at less wages, to which he had been assigned for a short time by reason of lack of work for the period in the employment for which he had been hired. This decision declares that the mere work at which the man happens to be engaged at the precise time of his injury does not absolutely fix or limit his amount of recovery, although it will have that effect in the majority of cases, for most men are injured at the work for which they were reguarly employed. It means that substantial justice must be done in each case; and if the man has been worth more and has earned more than the immediate work which caused his injury, he is entitled to the compensation legally attaching to the higher rate of wage.

Generally, there is an attempt to do away with the technical and the arbitrary in compensation practice, so as to make it as simple and free from legal technicalities as possible. There are provisions in every statute as to the time within which the workman must file his claim for compensation. Employers are seldom allowed to profit by these time limits, however, the courts and commissions usually being disposed to listen to the workmen, even if their applications have been made at a time subsequent to that specified in the statue. But in a Michigan case (Basse *vs.* Banner Coal Co., *167 Northwestern 954, p. 955*) it was shown that the Michigan laws required the claimant to file his claim within six months after the date of the injury. In this suit the workman had failed to make either an oral or a written claim until after the statutory time had elapsed. Then a written claim was presented, but it was not entertained, the court saying that it could not be heard, because the rights under the act had expired, so far as this injury was concerned.

The question of dependency also raises many uncertainties in the mind of the employer when it comes time to make settlement. This is especially true of the case where a son or daughter has contributed to the support of the parents. The question that most frequently puzzles the courts and employers is whether the reasonable value of the board which the child consumed should be deducted from the amount of the contribution which has been made to the parents each week. If this is allowable under the law, the deduction will make a material difference in the amount to be paid the dependents. In a Michigan case (Engberd *vs.* Victoria Copper Min. Co., *167 Northwestern 840, p. 841*) the court held that in instances in which a son had been living with his parents and contributing to their support, the reasonable value of his board should be deducted from the amount of the contributions made. This, however, is not the rule in all states, lively controversies frequently being waged over this point.

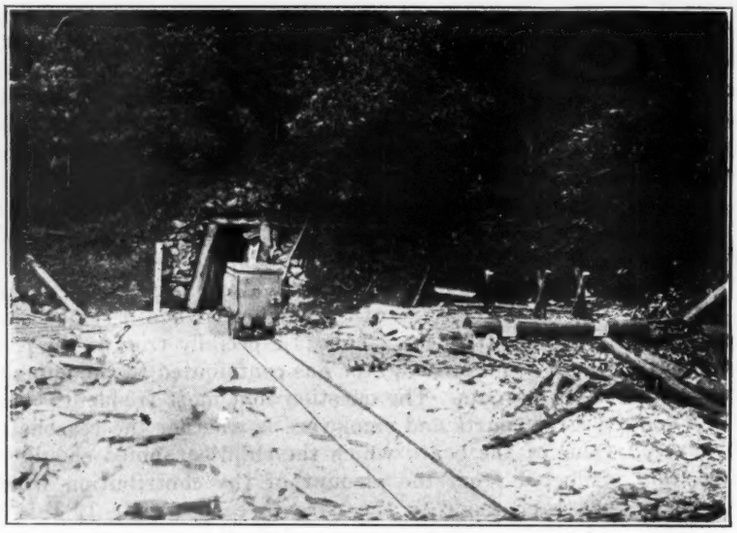
The compensation acts, as is generally known, secure the payment of compensation to workmen who have been incapacitated from earning their regular living by means of an accident arising out of and in the course of the employment. The employer's liability extends to the work the employee is hired to do and no further. In a case where a workman was injured while in his employer's hospital, it was held that he was not entitled to compensation, because he had not received his injury arising "out of and in the course of the employment."

These are, it is true, apparently trivial points, but they are those about which there is the greatest misunderstanding. Ninety per cent of the litigation involving the compensation acts, particularly in their application to mining operations, arises through the demand for their adjudication.

At all times employers engaged in mining operations, as well as others, must remember that the true criterion of their liability is the compensation act under which they are working. It explicitly defines the limits of their liability, and with the aid of the courts upon uncertain and complex sections of the law it should not be difficult to ascertain what the law really is upon any given point. These decisions should serve to clear the most obscure sections of compensation acts.

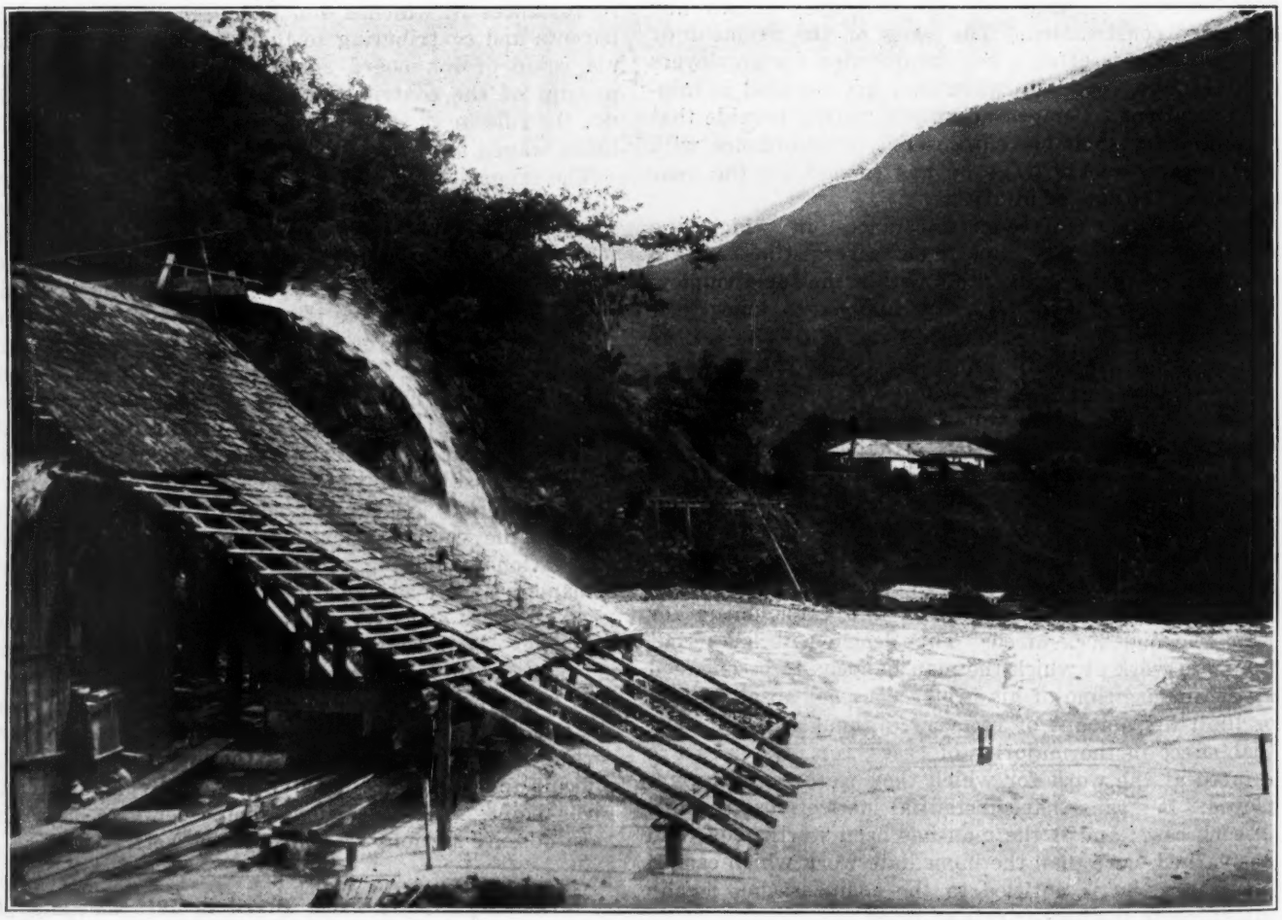
Manganese Exports From Brazil in 1918 amounted to 393,388 metric tons, according to a recent consular report. For the first time in five years shipments of this ore from Brazil showed a decrease.

Gold Mining and Milling in Colombia



UPPER ADIT AT EL RECREO MINE, IBAGUÉ DISTRICT

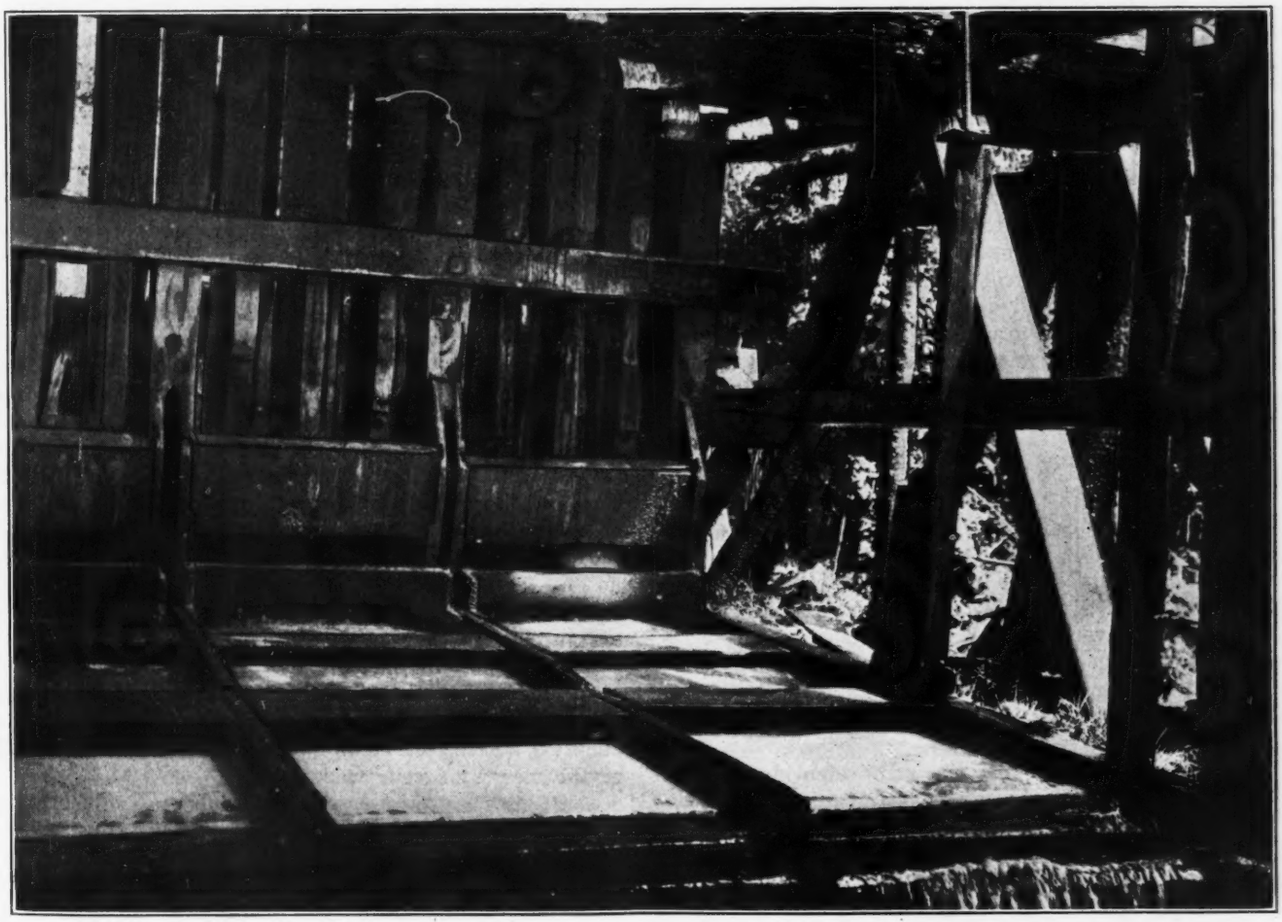
LOWER ADIT AT EL RECREO



WOODEN STAMP MILL AND TAILINGS POND AT EL RECREO MINE. OWNER'S HOUSE IS SHOWN IN THE BACKGROUND, AND BELOW THAT CAN BE SEEN THE ROOF OF A SECOND WOODEN MILL

OXEN CARRYING ORE FROM OTHER PROSPECTS TO STAMP MILL AT EL RECREO MINE

Gold mining, in the district of Ibagué, declined during 1918, on account of the extremely high prices for supplies and the difficulty of obtaining them, even at those prices. Blasting gelatin was $70 per box of 50 lb., carbide could not be obtained at any price, and the mines had to return to the use of tallow candles, made locally. The mines, especially gravel mines operated with small capital, experienced considerable trouble for some months in disposing of their product, on account of the low dollar exchange, but this condition improved, and at the close of the year the Medellin mint was able to coin all the gold produced. The El Recreo mine operated one wooden stamp mill throughout the year, and the profits were used for development work. The holdings of this property were extended in 1918 and now comprise 84 vein claims. (A Colombian claim is 600 m. by 240 m.) Two promising finds have been made in this ground, and are being developed. At one of these about 300 tons of ore, removed in the course of development work and crushed in the wooden stamp mill, yielded an average of 15 g. of gold per ton, on the plates alone. The second new discovery occurs in a chloritic schist, in a narrower but high-grade vein. Other operations in the Ibagué district during 1918 were as follows: La Golondrina mine employed a few men on development work, although its four wooden stamp mills were idle; La Norcasia mine, a new producer, started a wooden stamp mill and cyanide plant during the latter part of the year, and La Veta mine, abandoned by its former owners, was prospected by Emery Koch, an American miner.



INTERIOR OF WOODEN STAMP MILL, EL RECREO MINE, IBAGUÉ DISTRICT, COLOMBIA

New Uses for Zinc*

Zinc Institute Is Told That Publicity Is Necessary To Inform Public of the Desirable Qualities and Varied Industrial Applications of the Metal—Suggestions For Promoting Use of Zinc

BY GEORGE S. HARNEY
American Zinc Products Co., Greencastle, Ind.

FIRST and foremost, gentlemen of the Institute, I think we ought to begin our campaign of publicity right here at home. I think we ought to so change our phraseology and nomenclature that the word "zinc" should be omnipresent in our discussions. "Jack" and "spelter" are good names, perhaps, but they do not convey to the world that they are zinc. "Galvanizing," besides being a misnomer, is certainly not the correct term for coating a substance with zinc. "Zincking" a substance—zinc-coated sheets, nails, wire and similar material—would be an expression that would convey to the ear of the public the fact that zinc was used to preserve that metal or substance, and from this the public would learn that zinc was the principal factor in the operation. Similar reasoning should apply to "sherardizing" and other processes in which zinc and the preserving qualities of zinc are necessary to give the other metals life and standing in the commercial world. I suggest these changes for the reason that not one person in ten of this great public that we want to win to the uses and benefits of zinc knows that the words "jack," "spelter," "galvanizing," and "sherardizing" have any relation to zinc and its preserving properties. And if the public did know these things our battle would be half won.

Second, zinc needs a press agent. I do not refer to the grandiloquent and verbose personage who writes the fanciful stories of the prima donna's diamonds, nor the lurid pictures of the circus, its daring performers and rare animals, but the artist that would write the interesting stories of the usefulness of this strange metal and of the benefits it confers on mankind. Such articles I am sure would go "big" in our trade papers and publications, and, in view of the fact that the newspapers are searching everywhere for readable and instructive paragraphs that will interest humanity, they would no doubt willingly print them.

INFLUENCE OF TRADE PAPERS

Our trade papers have been very kind, in times past. They, too, are deeply interested in our success. If short and readable stories concerning the diverse and industrially valuable applications of zinc are furnished them, they will give such articles their initial push on their voyage over the world and on their mission of instruction. But these stories must use the word "zinc." The daily paper wants general items of interest, and not trade names. It wants short stories of human interest.

Stories about zinc may be semi-scientific in their nature. The world is ready to hear again the story of the Swiss clock that is run by the expansion of zinc. It will willingly read of the non-conducting properties of zinc as it relates to heat and cold. Why, even the story of how in years past zinc has been abused in having to work under so many noms-de-plume and noms-de-guerre is a good one and will not only be read, but it will correct an old-time error and aid the work we seek to do.

Such publicity should come from this Institute. I recall the concentrated publicity that has been engendered by manufacturers and producers of other products, and they were not so favorably situated. Take cement. One cent per barrel from the manufacturer, contributed to a central bureau, gave his product the publicity he sought. The railroad was told how to construct a water tank, and the farmer was instructed in making a pig trough of cement. Within the year, school children could talk in cement terms and knew of its uses. Team work won for cement. Team work will win for zinc!

I realize that we have in this Institute two divisions or sections that are not directly interested; but both are bound together in mutual interests in the production of the parent raw material. The producers of zinc pig desire to promote its wide consumption and distribution, and the users of the base metal seek to accomplish the same object.

PUBLICITY SHOULD ORIGINATE WITH THE AMERICAN ZINC INSTITUTE

We can well afford to waive any thought of direct results, if the whole trade is benefited by our team work. This Institute, I think, should father and promote the project of general publicity for our metal. It will cost little, but the general benefits in the education of the public as to what zinc will do, and what damage and deterioration it will prevent, will be enormous. We will all reap a benefit far beyond our personal contributions.

Thus far I have spoken only of publicity. From personal knowledge I know that "advertising" is not always "publicity." Like the grains of the "sower who went forth to sow," some advertising falls on "stony ground." But, to carry the simile further, the kind that falls on fertile soil will put you on "velvet" for life. If the "copy" is well prepared and the right media are selected, no one factor in your business will "bring home more bacon" than advertising. It is the red blood of business and the trade stream in the seas of commerce. No matter how humble or how pretentious, it speaks a vital story. The signboard at the crossroads, and the full-page ad in the big national daily, both have a clientele, and in both mediums the public will be informed of the merits of your wares.

Getting down to brass tacks (which are made in part of everlasting zinc), I would recommend that every producer of pig zinc adopt a trade name for his product, and in so far as his budget will allow him to do so he should herald that trade name to the world as being *zinc* and fit for use where zinc should be used.

*Excerpt from an address made at the St. Louis meeting of the American Zinc Institute.

In this work, our way has been blazed for several years past by the New Jersey Zinc Co., which has persistently and consistently insisted, through the trade journals and other media, that "Horsehead" and "Bertha" are the pure and proper metals for all human requirements to which zinc can be put. I am frank to tell you now that one of my purposes in coming here was to compliment our New Jersey friends on this pioneer work, as I feel that it has benefited all. Just how much benefit has been reaped by the company itself I hope will be told by those who represent the company at this meeting.

In referring to our New Jersey friends by name, I do not mean to convey the impression that they are the only users of printer's ink, but I believe you will agree with me that they have ventured further out into the general field than any of the rest of us, and that they have persistently stuck to their trade names. If they have been benefited, so will you be benefited. If their work has carried to the public something of the uses and benefits of zinc, this publicity, multiplied by the number of similar producers, will give an idea of the total. Personally, I feel that the results will be enormous, and if consistently carried on for a period of three to five years the public will be fully informed as to the usefulness of our product.

Now, as to those of us who deal more with the finished product, the field for publicity presents even a better opportunity. In the coming years zinc is to have a more extensive use. Those who fabricate the pig zinc or rolled sheets into a finished product must tell the world of its utility and usefulness, if they are to succeed. Be it a sheet for a roofing, or a slab for casting, the word "zinc" should follow on to the consumer.

Uses of Zinc To Be Emphasized

Hereafter, the world will get its vegetable products, such as teas, tobaccos, and like commodities, in zinc containers. It must be told that it is a zinc container, and that zinc is the very metal that will properly preserve the content. Nay, more: the man who offers the spurious substitute must be publicly denounced, and, if possible, prosecuted for his counterfeiting. We must no longer keep our light under the bushel. It is zinc that preserves steel and iron, and wood and fabrics. We must proclaim this fact wherever possible. Every advertisement must boldly proclaim that the product is zinc, and science will verify that zinc is the best metal for such use.

Because I have rambled somewhat in handling the subject assigned, may I offer a summary:

First. Zinc should at all times be referred to as zinc; this to correct past errors and aid the public in learning that zinc is the world's everlasting metal.

Second. This Institute should take up the matter of a press agent or publicity bureau, from which will come the true stories of the wonderful properties of the world's most useful metal.

Third. The producers of pig zinc should, if possible, give a trade name to their product and give as wide publicity as is possible to its merits.

Fourth. Those of us who market a finished product from zinc must say that it is of zinc, and refer to the metal's property of preserving the content as placed therein. The best part of the zinc producer's advertising story is that his product is made of zinc, and he should so inform the world.

Industrial Relations Commission Reports on Canadian Situation

High Cost of Living Chief Cause of Unrest—Whitley, Colorado and Leitch Plans Compared—Joint Industrial Councils Recommended for Canada

Toronto Correspondence

THE Canadian Commission on Industrial Relations, appointed to consider and present recommendations for securing improvement in the relations between employers and employees, has presented a comprehensive majority report from the chairman, Judge Mathers, and four other members. The commission finds that the high cost of living is one of the chief causes of labor unrest, and reports that there is everywhere a great reluctance to risk unemployed capital in new enterprises or the expansion of existing ones, owing to prevailing conditions. It approves of the ground taken in the peace treaty that "labor should not be regarded merely as a commodity or an article of commerce." The report recommends legislation providing for an eight-hour workday and a weekly rest of at least twenty-four hours; a minimum wage law, especially for women, girls and unskilled labor; state insurance for those unable to work; proportional representation from grouped constituencies, and restoration of freedom of speech and of the press. The commission approves of the principle of collective bargaining, which in its opinion does not necessarily imply the "closed shop."

The report outlines and makes suggestions as to various types of joint industrial councils, including the Whitley plan as in operation in about forty large British industries; the Colorado plan, which is in force in many American and some Canadian plants, and the Leitch plan, which is based on the American constitution. The essential feature of all these systems is that the human factor in industry is to be regarded as of first importance. The commission believes that in Canada a beginning should be made with joint plant councils, and more extensive organizations of district and national councils evolved therefrom as necessity arises. Every council must be the result of the unfettered choice of both employees and employers, and any attempt to enforce a definite plan upon either would be foredoomed to failure. Some machinery, however, should be established to take the initiative and bring the parties together. It is therefore recommended that a bureau should be established under the Minister of Labor to compile available information and statistics, and maintain officers, who would act between employer and worker.

The minority report, signed by Senator Smeaton White and Frank Pauze, finds that unemployment is largely due to the unequal distribution of labor. It expresses a doubt whether the Whitley plan would be suitable to Canadian conditions and considers that the Colorado plan, or a system similar to that under experiment by the Imperial Oil Co., would be more workable. The minority commissioners did not find any real poverty that was not properly taken care of by local institutions, and considered that a system of old-age pensions or unemployment insurance might seriously affect the ambition of the worker. They suggest the encouragement of joint industrial councils where such are established and that employers and employed be urged to institute forms of co-operative insurance, or other provision for pensions to old employees who are sick or invalided.

Mining Convention at Nelson, B. C.

Meeting of 200 Delegates Representing Various Sections of the Northwest—Formation of a British Columbia Branch of the Canadian Mining Institute—Interesting Addresses On Current Problems in the Canadian Mining Industry

ABOUT 200 delegates assembled on June 20, 1919, at Nelson, B. C., to organize a branch of the Canadian Mining Institute, in the interest of the mining men of the British Columbia interior. The convention was opened by S. S. Fowler, manager of the Blue Bells mines, near Riondel, B. C., who was selected as temporary chairman. Mr. Fowler explained the importance of the proposed organization in bringing about association and coöperation of mine operators, and for the purpose of establishing a means of acquainting government officials with the needs of the industry. Suggestions regarding the usefulness of the new branch were made by E. T. Hodge, professor of geology at the University of British Columbia; Ernest Levy, James Anderson, and Randolph R. Bruce.

Following formal organization of the branch, the delegates elected S. S. Fowler chairman, and W. G. Wilson secretary, to serve during the ensuing year. James Anderson, of Kaslo; Randolph R. Bruce, of Windermere; A. G. Langley, of Ravelstoke; F. S. Peters, of Rossland, and S. G. Blaylock, of Trail, were elected members of the executive committee. A reception was held in honor of the delegates, and addresses of welcome were delivered by Mayor J. A. McDonald, and the Hon. John Keen, Speaker of the British Columbia Legislature. L. K. Armstrong, secretary of the American Institute of Mining and Metallurgical Engineers, spoke of the importance of the mining industry to the city of Spokane, and of the debt of gratitude which that city owed to the mines of the Boundary district and the Kootenays. Mr. Armstrong delivered a message of goodwill from Philip N. Moore, former president of the A. I. M. E.

During the afternoon the American Institute of Mining and Metallurgical Engineers and the Canadian Mining Institute held a joint meeting, S. S. Fowler presiding. Three interesting papers were presented: "Mining Methods at the Granby Mines, Phoenix," by C. M. Campbell; "Nodulizing Copper Concentrate," by Oscar Lachmund, and "Tunneling Reminiscences," by Major Angus W. Davis.

The convention reassembled on June 21, Nicol Thompson, chairman of the Bureau of Mines, Board of Trade,

BIRD'S-EYE VIEW OF THE CITY OF NELSON, B. C.

Vancouver, presiding. Charles Camsell, of the Dominion Geological Survey, delivered an address on the geological features of the gold deposits of British Columbia. Mr. Camsell commented on the decrease in the gold production of the province, and pointed out the probable reasons therefor. He stated that the decrease in output was so alarming at one time that a commission was formed in England to discuss the problem of extending aid to the industry. In commenting on the gold production of Western Canada, Mr. Camsell said:

"It is not safe to argue that because each mile of Cordilleran chain to the south of the dominion has produced so much in mineral wealth, an equal amount per

mile will be found in the Canadian portion; but the difference is as yet so great, and so much of our country remains to be prospected, that we can well afford to feel that our production in gold, as well as in other metals, must increase until the difference per mile is greatly reduced. This and other conditions lead one to believe that as soon as industrial unrest is settled

DELEGATES TO THE CONVENTION GROUPED OUTSIDE CONVENTION HALL

we will have reached the downward limit of gold production in this province, and any change will be for the better. The same cannot be said of the outlook for gold production in the United States, but it is being urged there as a patriotic duty to produce gold, in spite of difficulties and discouragements, in order to maintain

LOOKING UP THE KOOTENAY LAKE, FROM NELSON, B. C.

their reserve and their credit, which is based on that reserve. The same duty devolves on Canadians, and I would earnestly urge prospectors to devote more time and effort to the discovery and development of gold deposits."

Mr. Camsell referred to the geological occurrence of primary gold deposits in the North American continent, and stated that practically all the gold deposits of British Columbia belonged to the second or younger period of mineralization, and that the whole production of gold is from these deposits. He said, further, that "All formations are believed to be closely related to the great intrusions of plutonic rocks that took place in the Jurassic period, and were formed at the time of intrusion or shortly afterward. Some of them appear as contact metamorphic deposits formed on the border of the igneous bodies, but most of them occur as veins both in the igneous bodies and in the intruded rocks in a zone surrounding the igneous bodies. No workable gold deposits have been developed in British Columbia whose origin may be attributed to the early Tertiary period, such as are found in Colorado, Montana, Utah and Idaho, or to the late Tertiary, as the bonanza deposits of Nevada, and portions of the adjoining states, and in Mexico. From 65 to 75 per cent of the gold produced in the Province of British Columbia is obtained from the smelting of copper ores, but in describing or dis-

cussing gold deposits in this paper I purpose considering only those deposits in which gold is the principal metal obtained. Placers need not be considered, as they are secondary, and derived from erosion from the primary deposits."

Mr. Camsell discussed the chief districts from which a production of lode gold has been made, including Atlin, Princess Royal Island, Bridge River, Hedley, Rossland, Nelson, Ymir, and Sheep Creek. Unfortunately, the interesting details of these districts cannot be published at this time, because of the limitations of available space.

Review of the Mining Industry

The Hon. William Sloan, Minister of Mines, reviewed the mining industry of the province, and in the course of his remarks he said in part:

"The aim of the provincial government is to establish the best of relationship between capital and labor. Only by so doing can the best results be obtained in the development of our natural resources, and this refers especially to the great mining industry in which we are so much interested. When in New York recently, I had many inquiries as to the situation in this province, and the prospects for profitable investment, and am therefore certain that as soon as the industrial unrest to which I have referred, and of which we all are so painfully aware, subsides, we shall be able to take up the work, confident that the sinews of war will be available in ample volume. It is a matter of comment outside the province that the mining laws of British Columbia are fair and just, and of such a character as to encourage the capitalist to find in the development of its minerals as safe a field for investment as is to be found anywhere. In the matter of taxation I may say that the policy of the government is to base its assessment to a constantly greater degree on net incomes alone. At present, unfortunately, there are not enough net incomes to make this possible and to pay the bills.

Ore-Testing Plant Assured

"While in Ottawa I conferred with the Hon. Mr. Burrell, Minister of Mines, on the matter of the establishment of an ore-testing plant in British Columbia. There has been an agitation for one here for many years. Mr. Burrell informed me that it was the government's intention to begin work on such a plant, the required finances having been provided by the dominion Parliament. I know of the difficulties experienced in this section because of the lack of facilities for the determination of what class of mill should be provided for the treatment of various kinds of ore, and there is no doubt that an ore-testing plant is a necessity in this district.

"It is interesting, in touching on the complexity of some of our ores and the consequent difficulty experienced in effecting full recovery of their values, to recall a statement made in Nelson a few weeks ago by J. J. Warren, general manager of the Canadian Consolidated Mining & Smelting Co., in the presence of Mr. Beatty, the president of the Canadian Pacific Ry. He stated that Mr. Blaylock, of the company's metallurgical staff, and his assistants had discovered a process by which silver, lead, and zinc can be recovered from the Sullivan mine ore. He is reported to have said also that the problem of the treatment of the low-grade gold-copper ores of the Rossland mines had been solved, and that within a short time the Rossland mines of the company would be turning out between 2,000 and 5,000 tons of ore daily.

"I sincerely trust that I have correctly interpreted the purport of these statements. The first should mean much to the operators of properties, of which there are not a few, with ore similar generally to that of the Sullivan mine. The second should result in the bringing to the historic mining camp of Rossland that prosperity which it has enjoyed for so many years and which we all are interested in seeing continued.

"With respect to the iron and steel industry, which is a matter to which I, as Minister of Mines, have been devoting much attention, I may say that we have on the coast and elsewhere large deposits of magnetite ores. These are of exceptional purity. We have been handicapped by the lack of hematite. As to what has been done, most of you are familiar with the Bounty Act, passed by the provincial government, granting a bonus of $3 a ton on pig iron produced in the province from local ores. This so far has not given the results hoped for, and was followed by an investigation of the possibility of the development of our iron ores by electric smelting. Alfred Stansfield was commissioned to come to the province and make a report thereon. His report indicates that our magnetites can be so treated, but that the cost of power stands in the way of making the enterprise a commercial success. Recently an electric smeltery expert came to the government and stated that he had an improved method by which it would be poscible to treat our ores more economically. As the government is much interested in this possibility, a small grant was made in order that this method might be demonstrated, and the results of the experiments will be known at an early date."

Addresses and Resolutions

Among the many other interesting addresses made at the convention were: "Revival of Local Treatment as Regards Flotation," by Francis A. Thomson, dean of the College of Mines, Moscow, Idaho; "The Iron and Steel Industry in British Columbia," by E. T. Hodge, professor of geology, University of British Columbia, which was followed by a discussion by Mr. Armstrong, of Spokane; "Platinum and Other Minerals Found in the Ultra-Basic Rocks," by William Thomlinson, of New Denver; "Mining and the Distribution of Minerals in the Kootenays," by A. G. Langley, district engineer for mineral survey district No. 5, and "Mineralization of Northern Manitoba," by R. C. Wallace, The Pas, Manitoba, the last paper being read by Mr. Armstrong. Mr. Fowler, as chairman of the committee appointed to investigate the justice or injustice of the charges levied by the Consolidated Mining & Smelting Co. on custom ore, gave a summary of the findings of the committee, which was to the effect that the charges had been justified.

The convention closed with the discussion and passage of a number of resolutions. The first was to the effect that returned soldiers be provided with an opportunity to prospect for minerals, the dominion government being asked to provide $200,000 to permit 200 returned men to be sent into the field. The second resolution requested the provincial government to arrange for the purchase of powder in large quantities for use in each mineral district, to be sold at a minimum charge. The third resolution called upon the government to appoint more district mining engineers.

DETAILS OF PRACTICAL MINING

Suggestions From Practice for the
Superintendent, Foreman,
and Miner

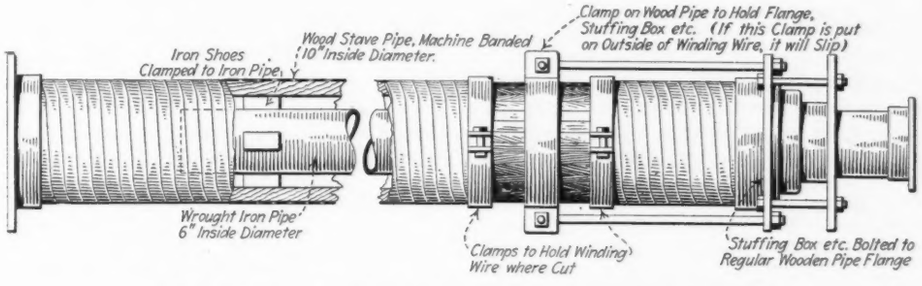
A Home-Made Slip-Joint

BY GEORGE S. STURGES

Manager, Jacket-Crown Point-Belcher Co., 1026 Mills Bldg., San Francisco, Cal.

Some years ago the Jacket-Crown Point-Belcher Mines Co. lost its incline sinking pumps when a fire started in the incline above the pumps, which were two-stage electrically driven centrifugals, and caused the water level to rise rapidly until it was approximately 200 ft. vertically above the point where it stood at the time of the fire.

After some time the management decided to recover the lost levels, which had been under water for about 25 years before the above pumping plant had been installed. It was impossible to duplicate the pumps without heavy expense and long delay, but I secured three two-stage centrifugals, one of which was used as an extra, and rigged up a long truck to fit the track in the incline. One of these pumps was placed at the lower end of the truck, and at the other end a 75-hp. motor was secured and belted to the pump. The truck was lowered on the incline by means of an electric winch, installed for use on the regular pumps, and was connected to a 10-in. machine-banded stave pipe by means of the home-made slip-joint shown in the accompanying sketch. The incline was fairly dry, and, although not entirely desirable for permanent service, the belted pump and motor, together with another similar unit placed on the first unwatered station, recovered the two lost levels and the big pumps, which were eventually placed in operation again. The motors were, of course, rewound, but otherwise the pumps were not damaged.


Clamp on Wood Pipe to Hold Flange, Stuffing Box etc. (If this Clamp is put on Outside of Winding Wire, it will Slip)
Wood Stave Pipe, Machine Banded 10" Inside Diameter.
Iron Shoes Clamped to Iron Pipe
Wrought Iron Pipe 6" Inside Diameter
Clamps to Hold Winding Wire where Cut
Stuffing Box etc. Bolted to Regular Wooden Pipe Flange

PIPE SLIP-JOINT USED IN RECOVERING SUBMERGED LEVELS

The discharge line from the pumps was made of machine-banded stave pipe and of different strength, to withstand increased pressure as the pumps were lowered. The particular piece from which the slip-joint was made was of that pipe used for the highest pressure, that it might be serviceable throughout the entire drop of the temporary pump. Approximately 1,150,000 gal. of water was pumped through the slip-joint every 24 hours. Such equipment as was available was utilized, but the joint construction would have been simplified had wrought-iron pipe been used instead of the wooden pipe, as explained in the article.

Laying Out Short-Radius Curves

BY JOHN FABER HANST

Mining engineer, 261½ Gross St., Pittsburgh, Pa.

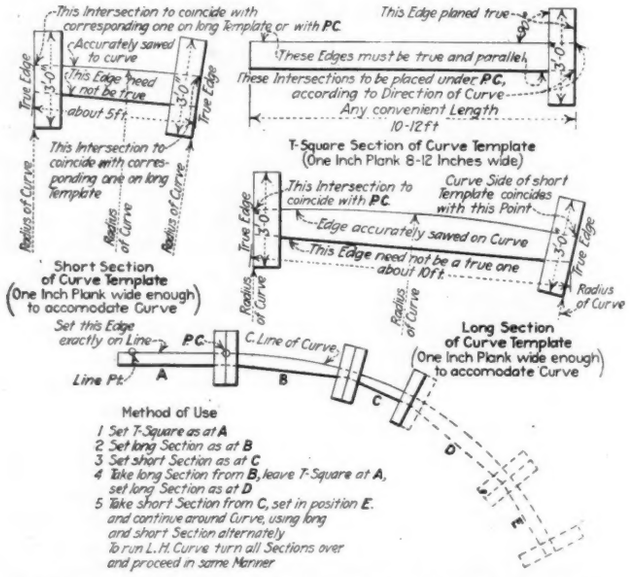
A method for laying out short-radius curves underground, and one that is particularly useful in driving drifts on a curve, is as follows. It has the advantage of being so simple that the miners themselves can apply it, its utilization requiring no calculation, and the results are sufficiently accurate for all ordinary work:

A curve templet of a required radius is laid out on a level floor, or on level ground, by the engineer, using a steel tape of sufficient length. To do this, a center point is marked, and, with the tape lengthened to the exact radius, an arc is struck off on a piece of 1-in. plank of any convenient length, 10 ft. being about right. The same is done with another plank half the length of the first. Similar cross-pieces are marked at each end of the curve planks, taking care to nail them exactly at 90° to the curve. This is easily done, provided the curve planks are held firmly in position when the arc is struck off and that the end points are marked. The edge of the tape itself will serve to strike off the correct line on which to nail the cross-pieces. The templet being constructed, proceed as follows:

At the *point of curve* (*P.C.*) of the curve set a plug or place a nail in the cap. On tangent, and in a direction opposite to the curve, set another line point at such a distance that it will fall within the length of the T-square section of the templet. Place the T-square with one edge on line, using plumb bobs suspended from the line plugs, and with the outside intersection of the straight-edge and the head exactly at the *P.C.* Holding this firmly, bring one curve templet so that the head coincides with the T-square head, and with the curved edge running in the proper direction. To reverse the direction of curve, simply turn the templet over, thus using the same templet for right or left curves. Now hold the curve templet and bring the shorter templet to position, carrying one ahead of the other as far as necessary. In this manner, with one setting of line plugs by the engineer, the miners can check up their drift after each blast, or as often as desired. The short and long sections enable the true line to be carried

right into the breast at all times without difficulty.

Of course, when the *P.T.* is approached, it will be necessary for the engineer to run a survey around the curve and spot the exact *P.T.*, giving lines for the tangent at the same time. Most of this work, however, can be done in the office, especially if the survey points are figured on a co-ordinate system. This, by the way, is the only logical and systematic way of surveying a mine, and with a good accurate map on a scale of 50 ft.


This Intersection to coincide with corresponding one on long Template or with PC
This Edge planed true
Accurately sawed to curve
This Edge need not be true about 5ft
These Edges must be true and parallel
These Intersections to be placed under PC, according to Direction of Curve
Any convenient Length
10-12ft
T-Square Section of Curve Template
(One Inch Plank 8-12 Inches wide)
This Intersection to coincide with corresponding one on long Template
Short Section of Curve Template
(One Inch Plank wide enough to accomodate Curve
This Intersection to coincide with PC
Curve Side of short Template coincides with this Point
Edge accurately sawed on Curve
This Edge need not be a true one about 10ft
Radius of Curve
Set this Edge exactly on Line
PC
C. Line of Curve
Line Pt
Long Section of Curve Template
(One Inch Plank wide enough to accomodate Curve
Method of Use
1 Set T-Square as at A
2 Set long Section as at B
3 Set short Section as at C
4 Take long Section from B, leave T-Square at A, set long Section as at D
5 Take short Section from C, set in position E, and continue around Curve, using long and short Section alternately
To run L.H. Curve turn all Sections over and proceed in same Manner

METHOD OF LAYING OUT SHORT-RADIUS CURVES

to the inch it is possible to determine the position of a point with great accuracy.

For the benefit of those to whom this method of laying out a curve is new, sketches of the templet and the manner of application are appended. The method is in general use in many of the mines of the Lake Superior iron ranges, and, so far as I know, was developed by the engineers of the Cleveland-Cliffs Iron Company.

Uses for Empty Carbide Cans*

BY E. P. HUMPHREY

Several uses can be made of the 100-lb. tin carbide containers, instead of throwing them away. They have a small refund value, but when the freight is paid it amounts to practically nothing. One use is to place them in the machine shop so that the machinists can put their turnings and borings into them, one for each kind; and then, when a car of scrap is to be loaded, the filled cans are placed in this car. The blacksmith also should have some of these containers for his scrap ends. The practice is not only a great labor saver for the mine or shop operator, but also for the receiver of the car, as it greatly facilitates unloading.

These cans may also find place in the shop as receivers for dirty cotton waste and wiping cloths. Some reclaim the cotton waste, and the oil residue is used on gearing. A few cans of this oily waste are handy in the winter time for thawing pipes. A locomotive fire may be easily started with it, saving good waste and oil which the engineer is likely to use in order to secure a quick, sure fire.

Another use lies in substituting the cans for bags in carrying feed to mules in the mines. They can be easily cleaned and dried, and with the screw top are moisture and rat proof. This feature is especially useful in the small mine, where there may be only one mule that is cared for by the driver. The tendency when bags are used, as in ordinary practice, is for the feed to get wet and be left out for the rats.

*From *Coal Age*, Apr. 24, 1919.

Motor Generator for Mine

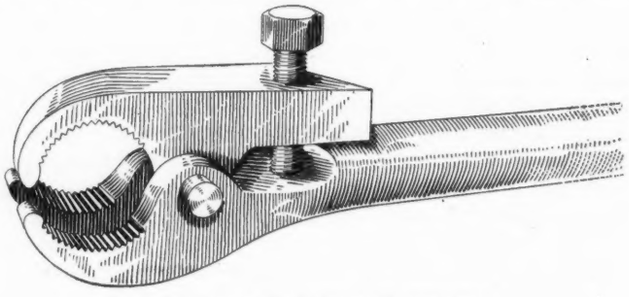
There are periods when the electrical load of a mine is light, and then, in an instant, the demand for power may jump to several times the average. Such conditions occur with the starting or stopping of hoists and locomotives, and demand an extra high peak-load performance of the generating apparatus. This is especially true as regards synchronous motor-generator sets, because the generators are denied the relief afforded by the fall in speed of an engine-driven set, being run at constant speed.

A new synchronous motor-generator set, which embodies the continuous power-factor correction common to such sets with very high overload and peak capacity, has recently been put on the market by the Westinghouse Electric and Manufacturing Co. It consists of a Type-G 3-phase, 60-cycle, synchronous motor, driving a Type-SK, 150-275-volt compound generator. The machine has three bearings, the pedestals and field frames being mounted on a common bedplet. The full-load rating is based on continuous capacity with 35° C. rise on the generator, 45° C. on motor armature, and 50° C. rise on motor field, with 80% power factor. After a two hours' run at 50% overload, the generator temperature rise will not exceed 55° C., and the motor 55° C. On test, commutation was satisfactory at 250% load. The compound field is adjusted to give 10% increase in voltage from no load to full load.

A Sure-Grip Wrench*

BY CHARLES H. WILLEY

A wrench which may be made of a convenient size and will be found invaluable for the purpose of gripping any round stock, pipe, studs, or similar material is shown in the accompanying cut. The device was invented to answer the need of a positive grip wrench for removing stubborn pipes and studs. The pin is slipped out when putting the wrench on or removing it from the work. By screwing down the small threaded bolt, the jaws of the wrench exert a firm grip on the pipe or stud.



WRENCH FOR ROUND STOCK

*From *Coal Age*, Apr. 3, 1919.

NEWS FROM WASHINGTON

By PAUL WOOTON
Special Correspondent

Our Mineral Wealth

Pooling of information at the Peace Conference regarding the mineral deposits of all countries has served to emphasize the great mineral wealth of the United States. Dr. J. B. Umpleby, the geologist in charge of foreign mineral deposits for the U. S. Geological Survey, who was in Paris as a special mineral adviser, points out that in the past the course of conquest and the seat of empire have been determined by mineral deposits. These, he believes, will now determine industrial supremacy. In 1913, the latest normal year, the United States held first place in the production of thirteen of the thirty most important mineral commodities. It held second place in the production of four, while it contributed 5 per cent of four other minerals.

The United States, during 1913, on which year Dr. Umpleby bases his figures, produced 39 per cent of the world's coal; 36 per cent of the iron; 56 per cent of the copper; 37 per cent of the zinc; 30 per cent of the silver; 17 per cent of the tungsten; 38 per cent of the molybdenum; 65 per cent of the petroleum; 95 per cent of the natural gas; 16 per cent of the arsenic; 43 per cent of the phosphates, and 20 per cent of the salt.

In the same year, the Transvaal produced 41 per cent of the world's gold; Russia, 99 per cent of the platinum; Peru, 76 per cent of the vanadium; Russia, 55 per cent of the manganese; Rhodesia, 35 per cent of the chromic iron; Canada, 85 per cent of the nickel; China, 53 per cent of the arsenic; India, 59 per cent of the mica; Spain, 54 per cent of the pyrites; Italy, 43 per cent of the sulphur; Germany, 99 per cent of the potash; Chile, 99 per cent of the nitrates; France, 58 per cent of the bauxite; Austria, 39 per cent of the graphite; Malay States, 40 per cent of the tin; Spain, 31 per cent of the mercury, and Austria, 74 per cent of the magnesite.

Virginia Emery Equal to Turkish

Emery deposits developed in Virginia during the war are yielding a product in every way equal to Turkish emery, according to F. J. Katz, of the U. S. Geological Survey. This opinion was expressed after tests had been made at the Bureau of Standards. Mr. Katz doubts, however, if it will be possible for the Virginia production to continue, as the freight rate from the southern part of the state to the emery-crushing mills in New York, Massachusetts, and Pennsylvania is such as to make it impossible to compete with the Turkish product, which reaches this country largely as ballast for light, bulky cargoes. As the operation in Virginia is small, there is no expectation that a tariff can be secured, and it is anticipated that work will have to stop as soon as imports from Turkey are resumed. The fact, however, is established that the country is independent of foreign supply if conditions warrant the development of the Virginia deposits on a large scale.

War-Minerals Relief Act Interpreted By Attorney General

Material reduction in the number of claims which will be allowed under the War-Minerals Relief Act will result from an opinion by the Attorney General in interpreting Section 5 of the act. The opinion was rendered to the Secretary of the Interior as follows:

I acknowledge receipt of your letter of June 25, 1919, asking my advice as to the proper construction of the words "request or demand" as used in Section 5 of that Act of Mar. 2, 1919 (40 Stat. 1272). The part of this section containing these words is as follows:

> "That the Secretary of the Interior be, and he hereby is, authorized to adjust, liquidate, and pay such net losses as have been suffered by any person, firm, or corporation, by reason of producing or preparing to produce, either manganese, chrome, pyrites, or tungsten in compliance with the request or demand of the Department of the Interior, the War Industries Board, the War Trade Board, the Shipping Board, or the Emergency Fleet Corporation." . . .

The words "request" and "demand" are both synonyms of the word "ask." A demand might perhaps be said to be a "peremptory request." The claims recognized by this section are those of persons who have suffered loss by "producing or preparing to produce either manganese, chrome, pyrites, or tungsten *in compliance with the request or demand* of the Department of the Interior, the War Industries Board, the War Trade Board, the Shipping Board, or the Emergency Fleet Corporation." That is, one of the five governmental agencies must have asked (either by request or demand) the claimant to produce or to prepare to produce one of the four named minerals. The statute specifies the five agencies authorized to make request or demand for the production of minerals, specifies the minerals, and specifies that the production, or preparation for production, must have been *"in compliance with* the request or demand" of one of the five agencies.

The language used could hardly be more clear or allow less room for construction. No claim based upon a general appeal or solicitation is authorized by it, but to come under the statute the claimant must have been asked specifically by either the Department of the Interior, the War Industries Board, the War Trade Board, the Shipping Board, or the Emergency Fleet Corporation to produce or prepare to produce one or more of the four named minerals.

In your inquiry you state:

> "Many claims have been filed which appear to be based upon an asserted reliance upon appeals to the general public for the production of these minerals alleged to have appeared in the newspapers, etc."

As I have stated above, the statute does not authorize the recognition of a claim based upon a general solicitation or appeal. This is apparent from the provision itself. It is also apparent from the history of the enactment (which it is unnecessary to detail here) that it was intentionally framed so as to exclude such claims as are referred to by you.

The Federal Reserve Board announces the removal of all restrictions from the export of bullion, coin, and currency. Applications and licenses are no longer required. An exception to the ruling is that part of Russia under Bolshevik control.

William Thum, Noted Metallurgist, Dead

Inventor Prominent in the Introduction and Development of the Electrolytic Refining Process in the United States Expires at Hammond, Ind.

WILLIAM THUM, metallurgist and inventor of prominence, and a pioneer in the art of electrolytic refining in the United States, died on June 28, 1919, at his home, at Hammond, Ind. Mr. Thum was born in Germany in 1863, in the parish house of his grandfather who was a clergyman in the small town of Bleichenbach, Oberhessen. After spending about seven years of his early boyhood days on the coast of Wales, where his father, F. A. Thum, a distinguished mining engineer of the Clausthal School of Mines, was in charge of a zinc plant, he attended preparatory schools in Germany until 1879, when he, with his parents, came to the United States.

WILLIAM THUM

In 1883 Mr. Thum became assistant superintendent of the Balbach Smelting & Refining Co., at Newark, N. J., and there, in association with his father, he began the development of the first electrolytic refinery in the United States, laying the foundation of an industry which has assumed gigantic proportions in this country. At the time of Mr. Thum's connection with the Balbach Smelting & Refining Co., that company was using the Parkes process for lead refining.

In 1904 Mr. Thum served as superintendent of the De Lamar Copper Refining Co., at Chrome, N. J., and in 1906 he became superintendent of the electrolytic lead refinery of the United States Metals Refining Co., at East Chicago, Ind. This was the first plant of its kind in the United States. A refinery was in operation at Trail, B. C., and another at Newcastle-on-Tyne, but these plants recovered no byproducts except gold and silver.

At East Chicago, Mr. Thum developed a process which recovered bismuth, tellurium, and antimony as byproducts in the electrolytic refining of lead. Later he took out a number of patents, among which are: A patent for a process for the electroplating of metals, especially lead; one for the separation of bismuth from copper, which covered a particular feature of the complete process; a patent for an apparatus for use in the Pattersonizing process, and one for an improved method of construction for a round-bottom tank. Another patent was for a horizontal cell for parting doré bullion which is today in use in a number of plants, and which was an improvement on his father's earlier design.

However, Mr. Thum's most important general contribution to the metallurgical art was a method which made practicable the basic process of Anson G. Betts, which had been previously patented in the United States.

William Thum was one of the most versatile of men, in addition to his distinguished professional attainments. He painted in oils and watercolors and was dextrous with the pencil in caricature. He spoke French as fluently as English and German, and read Latin with great facility, from which he would frequently quote. Mr. Thum was interested in botany and possessed an extensive knowledge of bird and animal life. Being an ardent hunter in former years, he made many trips to Maine for moose and in recent years he indulged in duck shooting.

Mr. Thum was well known for his charity, sympathy, and general human qualities. During the war, he was active in the many Liberty Loan campaigns, and took a prominent personal part in the procedings of the specific patriotic societies of the East Chicago-Hammond district in Indiana.

The Waihi Gold Mining Co., Ltd., In 1918

During the year 1918, according to the last report, the Waihi Gold Mining Co., Ltd., treated 188,998 short tons, dry weight. The ore was mined from seventeen different reefs, which contributed to the total production in amounts ranging from 84 to 59,138 tons. The gold and silver sold realized £387,065. Interest (including £3,109 income tax deducted therefrom) amounted to £23,282, and £4,491 was received from a neighboring mine for ore inadvertently mined in previous years, making a total of £414,838. The expenditure in New Zealand and London, including development work at the mine, amounted to £215,564, leaving a balance of £199,274. The above sum, added to the balance of £62,435 brought forward from the preceding accounts, totals £261,709. After all appropriations, including dividends amounting to £99,181, the balance remaining to the credit of revenue account at Dec. 31 was £52,953.

The ore reserve shows a decrease of 116,846 tons, of which 96,955 tons is from the general account and 19,891 tons is from the suspense account. The total reserve on Dec. 31, 1918, was 602,789 tons in suspense account and 556,761 tons in general account.

The development and dead-work footage amounted to 7,366.5 ft. in 1918, of which 3,975.5 ft. was in connection with the extraction of suspense ore. No shaft sinking was done during the year. The mill ran 298.6 days. The average number of stamps running was 120.412. The ore crushed amounted to 188,998 tons, representing a daily average stamp duty of 5.255 tons, being a decrease, compared with the previous year, of 0.091

tons per stamp day. The average number of tube mills running was 6.89.

The average assay of the ore treated was 0.375 oz. gold and 2.764 oz. silver, a total value per ton of £1 16s. 10.25d. The average assay of the residue was 0.026 oz. gold and 0.456 oz. silver. The average extraction was 93.1 per cent of the gold and 83.5 per cent of the silver, or 91.7 per cent of the total gold and silver in the ore treated. The proportion of the ore treated as sand was 21.77 per cent, as slime 76.81 per cent, and as concentrate 1.42 per cent. All concentrate produced, amounting to 2,676 tons, was treated in the concentrate-treatment plant.

George S. Rice Discusses Trip To Foreign Fields

Reclamation of French Mines Delayed—England Considering Discontinuance of Coal Exports—Germans Mining Coal for France Under Military Control

WASHINGTON CORRESPONDENCE

THE French are showing engineering ability second to none in the rehabilitation of their coal mines, according to George S. Rice, chief mining engineer of the U. S. Bureau of Mines, who just has returned from a personal survey of the coal situation in France, Belgium, Germany, and England. The reclaiming of the French mines, however, is being delayed by the French governmental policy, which Mr. Rice does not undertake to criticize. The policy to which he refers is that of opposing the purchase of foreign mining machinery, owing to the overwhelming balance of trade against France.

In Great Britain, Mr. Rice found that the financial interests are frankly calculating the effects of a total discontinuance of coal exports from England proper. Apparently, England needs all the coal she can produce. It is evident that present restrictions on local consumption of coal cannot be continued indefinitely. Mr. Rice found powerful influences at work tending toward the nationalization of coal mines. He gained the impression, however, that the opinion of the majority of the people is that the time is not ripe for the nationalization of the coal industry. That sentiment, however, may not have crystallized to the point where it may be effective in preventing such a step.

Mr. Rice went to Europe several months ago at the head of a Bureau of Mines commission. He now is engaged in writing a report on the great deficiency in the fuel supply of Europe. He also will reduce to a report other observations and conclusions that he reached as a result of his trip. In a running story of his survey, Mr. Rice says:

"On our arrival in Paris, thanks to Professor Probert, our itinerary was practically arranged. Through the kindness of Secretary Baker, a military automobile was placed at our disposal. This greatly facilitated our movements in a territory where ordinary means of transportation are largely disrupted. We visited first the Lorraine iron mines. Then we went to the French steel plants which had been destroyed by the Germans. We visited the mining areas of Luxemburg and those in the vicinity of Metz, after which we went through the Sarre coal fields, where we saw the German miners working under French military control, helping to supply, in part, the loss of production in the Pas de Calais field. We then returned to Paris via Verdun, where we had the honor of spending the night in the citadel as the guest of the commandant. We had an opportunity to go over the whole battle area on which occurred the most intense conflict in the whole history of clashing arms.

"On return to Paris, Dr. Cottrell left us to visit the air-fixation plants in Germany. Professor Probert and I went to the Pas de Calais coal field. In addition to examining the mines which had been wilfully destroyed, we made interesting observations at the principal French mines which escaped that fate. These mines continued in operation during long periods when they were under shellfire. Professor Probert then returned to the United States. I was requested to take part in an advisory capacity on coal matters in an Allied conference with German representatives at Cologne. The object of the conference was to obtain information as to what Germany had to offer in exchange for foodstuffs. As France and Italy each was in great need of coal and coke, it was hoped that Germany might have a surplus of these fuels. It proved that Germany had no coal and coke from the Westphalian field to offer, other than that already going to the occupied territory on the west bank of the Rhine. Strikes and labor difficulties, ascribed partially to food shortage, had cut down the output. It was at this conference that the Germans complained that the French had made no accounting to them of the coal taken from the Sarre Valley. Major General Gaillard, who presided, merely smiled and did not call attention to the fact that they also had received no bill for the damage done French coal mines. The bearing of the Germans on that occasion was not that of those who recognize military defeat.

"While waiting for the conference to convene, I had time to visit the mines on the west bank of the Rhine in the Westphalian field and the remarkable brown coal field near Cologne. On the return from Cologne I visited the mining region of Belgium from one end to the other—from Liége to Mons—and thence continued over the line into the devastated region as far as Lens.

"I was detained in Paris by some matters pertaining to the Economic Commission's work, but as soon as I could get away I went to the south of France to visit the St. Etienne, Marseilles, and Alais coal fields. I was interested particularly in the latter, where there are great outbursts of nearly pure carbonic-acid gas which appears to be held under a very high compression in the coal.

"I then went to England, where I visited the typical iron mines in the Cleveland and Cumberland district; the oil-shale workings in Scotland and various typical collieries."

American Institute of Mining and Metallurgical Engineers

From a technical point of view, the Chicago meeting of the Institute, to be held Sept. 22 to 26, inclusive, promises to be one of the most interesting in its history. The wealth of material in the line of technical papers for discussion is greater than has been offered for any previous meeting. More than 150 papers have been submitted to the committee, which is finding it no small task to arrange a program with a minimum of conflicts among papers on allied subjects.

One of the excursions to be made by the Institute as a body during this meeting is to the La Salle district. A special train leaving Chicago early Thursday morning will take the members and guests to La Salle, Ill., where automobiles will convey the different parties to the coal mines, cement works, and zinc smelteries. For the ladies, and for others of the party not particularly interested in these industrial operations, the La Salle hosts plan an automobile trip to Starved Rock.

South African Gravity Stamp Practice*

The Use of Large-Mesh Stamp-Battery Screens, Together With an Increase in Tonnage, Raises the Question of a Substitute

FEW novel ideas have come into practice in Witwatersrand metallurgy during the last decade. Sixteen years ago H. S. Denny (who was at the time second in command to his brother in the technical administration of the affairs of the General Mining and Finance Corporation) read his noteworthy paper on "Main Reef Milling and Cyaniding Practice," and proposed certain reforms which had previously been adopted in other parts of the world, notably western Australia. Mr. Denny's valuable contribution to the technical literature of the gold fields was quickly followed by the adoption of some of the innovations suggested.

The New Goch and Glen Deep erected tube mills, fine grinding soon became general practice at most of the large and modern mills of the Rand, the mill screening employed became coarser and coarser, and the duty of stamps, which in 1903 seldom exceeded five tons in the 24 hours, rose to proportions which demonstrated that the functions of the gravity stamp battery had in some degree been changed. The new metallurgy grew apace, and, before long, tube mills were installed from one end of the Reef to the other. Fine grinding became part and parcel of Main Reef practice, and slime, which was the bugbear of the metallurgist in the earlier days of the fields, quickly lost its terrors.

Then followed a period in which the practical ramifications of the new metallurgy were extended to the adoption of filter presses and agitators, and as knowledge of these devices became extended and practice improved, the tendency to create more and more slime advanced in keeping with the growing tendency to make the apertures in the mill screening coarser and to throw more and more duty upon the tube mills. Today no less than 80% of the gold recovered by a leading mine is obtained from the slime product.

The evolution of the new metallurgy can easily be traced from the early part of 1903, when there was not a single tube mill at work along the Reef, up to the present day, when every mine from South Randfontein to Springs employs one or more of these machines for secondary pulverization of the ore, and between 300 and 400 tube mills are in daily operation. The development of the new metallurgy has been even and uncheckered, and for the last year or two it has seemed as if a stage of general practical perfection had been reached. Details are constantly being experimented with or improved on, but the general impression has been that an established technical status of high capacity has been attained, as well as reasonable cost and low residues, which does not offer or suggest much scope for the adoption of any important or epoch-making ideas.

Bearing all this in mind, it is at least interesting to learn that there is a suggestion that in the equipments of the future the gravity stamp may disappear altogether. In support of this view it is pointed out that screening as coarse as a ½-in. mesh is being employed in at least one of the newer mills, and it is contended that ore can be reduced to this size by means of a system of stage crushing in rock breakers, and by the employment of a form of crusher combining both the gyratory principle of the Gates type with the percussive action of the Blake-Marsden. I understand that the Sturtevant crusher is considered to comply with the necessary requirements, and there is one school of thought which claims that by the employment of these methods the stamp battery, with its heavy capital charges, becomes unnecessary.

The employment of coarse mill screening has resulted in the duty of a stamp being increased to a figure unheard of 12 or 15 years ago. On the Further East Rand there are three or four reduction plants in which the amount of ore crushed is over 20 tons per diem. In January, for instance, the duty per stamp at the Government Areas was nearly 25 tons in the 24 hours, and at the Modder Deep it was 23.8 and at the Van Ryn Deep 22.4 tons. Latterly the Chamber of Mines has discontinued the inclusion of a column exhibiting stamp duties in the monthly analysis of output. This publication now, however, gives more detailed information in regard to stamps and tube mills erected and at work and running time in respect of both forms of ore crushers, and the following table of stamp duties on the newer Far East Rand mines, compiled from the chamber's January returns, should be instructive in connection with the subject of the present achievements and functions of gravity stamps in the more modern plants of the Rand:

STAMP DUTIES AT MINES OF THE FAR EAST RAND

	Erected		At Work		Days Milling			
	Stamps	Tube Mills	Stamps	Tube Mills	Stamps	Tube Mills	Tons Crushed	Stamp Duty per 24 Hours
Brakpan	140	12	110	10	23.0	26.94	42,000	16.6
Government Areas	200	25	180	22	23.77	24.83	106,500	24.8
Modder B	104	8	104	8	27.01	28.66	58,000	20.6
Modder Deep	70	8	70	8	26.66	26.88	44,400	23.8
New Modder	236	15	236	15	22.44	21.86	76,000	14.3
Springs Mines	80	8	80	8	18.87	20.14	33,350	22.1
Van Ryn Deep	90	9	90	9	21.2	25.07	42,000	22.4

These figures demonstrate that the tube mill now performs a considerably greater proportion of the work in the reduction plant than formerly, and the contention under consideration is that large savings on capital account can be effected in new plants by eliminating stamp batteries altogether and feeding the product of the final crusher direct into the tubes. The idea is not a novel one. Many attempts have been made in other parts of the world to supplant the gravity stamp by utilizing rolls, grinding pans, and other devices.

In most instances the cost of maintenance has been the chief factor detrimental to the substitution of other devices for the California stamp, and the claim that the employment of crushers or combined gyratory and percussive action can prove satisfactory rivals to the present system of crushers and stamps will have to be proved before it finds many adherents.

*Reprinted from the *S. A. Mining and Engineering Journal*, Mar. 15. 1919.

Monthly Copper Production for 1919

The table which appears herewith is compiled from reports received from the respective companies (except in the cases noted as estimated), together with the reports of the U. S. Department of Commerce as to imported material, and in the main represents the crude-copper content of blister copper, in pounds.

MONTHLY CRUDE-COPPER PRODUCTION, 1919

	March	April	May	June
Alaska shipments (*c*)	1,471,398	2,153,691	1,134,272	2 374 843
Arizona:				
Arizona Copper	2,800,000	2,400,000	2,400,000	2,400,000
Calumet & Arizona	4,602,000	3,822,000	4,308,000	4,872,000
Cons. Ariz. Smelting	720,000	770,000	690,000	.....
Inspiration	6,700,000	6,900,000	6,200,000	6,300,000
Magma	1,000,212	674,943	730,548	.....
Miami	4,551,115	4,489,748	4,989,580	4,385,865
New Cornelia (*a*)	1,980,000	2,000,000	1,408,000	2,708,000
Old Dominion	2,574,000	2,389,000	2,564,000	2,015,500
Phelps Dodge	6,434,000	6,560,176	6,783,900	6,680,335
Ray	3,792,000	3,650,000	3,975,000	3,890,000
Shattuck Arizona	2,452	*Nil*	*Nil*	*Nil*
United Verde	*Nil*	*Nil*	1,250,000	3,525,000
United Verde Extension	*Nil*	*Nil*	*Nil*	2,806,849
California:				
Mammoth	1,475,000	1,386,000	620,000	*Nil*
Michigan:				
Calumet & Hecla	9,652,053	8,554,113	6,796,819	5,439,761
Other Lake Superior (*b*)	6,500,000	6,500,000	6,500,000	6,500,000
Montana:				
Anaconda	13,900,000	13,750,000	13,500,000	10,530,000
East Butte	1,700,230	1,347,580	1,414,460	1,513,360
Nevada:				
Mason Valley	*Nil*	*Nil*	*Nil*	*Nil*
Nevada Cons.	3,650,000	3,763,000	3,700,000	3,715,482
New Mexico:				
Chino	3,770,000	3,498,747	3,583,396	3,615,458
Utah:				
Utah Copper	8,366,000	9,420,000	9,125,000	9,528,000
Eastern smelters (*b*)	1,400,000	1,400,000	1,400,000	1,400,000
Total reported	87,040,460	85,428,998	83,072,975	.....
Others, estimated	15,000,000	13,380,000	9,580,000	.....
Total United States	102,040,460	98,808,998	92,652,975	.....
Imports: Ore and concentrates, etc.	10,146,979	9,773,655	7,946,560	.....
Imports in blister, etc	49,564,536	22,781,489	15,997,164	.....
Grand total	161,751,975	131,364,142	116,596,699	.....
British Columbia:				
Granby Cons	667,142	1,333,523	1,848,802	.....
Mexico:				
Boleo	2,039,520	1,433,040	1,322,720	1,256,640
Cananea	3,200,000	3,000,000	3,000,000	3,000,000
Phelps Dodge, Mexican properties	1,900,000	1,702,000	1,552,000	1,735,000
Other foreign:				
Cerro de Pasco	4,838,000	4,780,000	4,034,000	4,026,000
Chile	4,568,000	5,024,000	5,066,000	.....
Katanga	3,262,800	4,298,970	2,094,370	.....
Backus & Johnston	2,144,825	.....	.....	.....

(*a*) Only electrolytic cathodes are entered. New Cornelia also produces some copper from ores sent to Calumet & Arizona smeltery. (*b*) Estimated. (*c*) Official figures of the U. S. Department of Commerce; includes Kennecott production from its Alaska mines.

Production of the United States by months since the beginning of the year and the corresponding figures for 1918 were as follows:

	1918	1919
January	165,431,568	135,733,511
February	160,011,364	111,649,512
March	185,525,168	102,040,460
April	163,207,096	98,808,998
May	181,070,350	92,652,975

The grand total includes, under "Imports in ore and blister copper," the production of such companies as Granby, Cananea, Braden, Cerro de Pasco, and Chile. As a matter of record, however, the individual figures are given after the total. We also report the copper output of the Boleo and Katanga companies, which does not come to the United States.

Cupro-Nickel Stock for Sale

The War Department, through the Director of Sales, has recently been making inquiries designed to develop a market, other than that afforded by the United States Mint, for approximately seventy-five carloads of cupro-nickel, the material from which the five-cent piece is coined. This material was acquired by the department for making metal jackets that incase the .30 calibre bullets, and other small-arms ammunition. The alloy obtained for military purposes has a slightly higher copper content than that used for coinage. It consists of 85 per cent copper and 15 per cent nickel. Cupro-nickel is stronger than brass, and maintains through long usage a natural nickel finish.

New Suits Brought for Deportation At Bisbee

Cases Rushed Through Just Before Two-Year Statutory Time Limit Expires—Plaintiffs Ask Over $5,000,000 Damages—Some Arrests on Criminal Charges

AS AN OUTGROWTH of the Bisbee deportation which took place July 12, 1917, civil suits to the total of 272 were filed on July 10, at Tombstone, Ariz., the county seat of Cochise County. Damages amounting to over $5,000,000 are sought, on the ground of alleged assault, bruising, beating, and wounding by plaintiffs; 166 of the cases ask for $20,000 damages each, one-half of which is claimed for actual damages and the remainder for punitive damages; 75 of the cases ask for $25,000 each, and 31 ask for $10,000 each.

The plaintiffs in the majority of the cases are men who it is alleged were deported, or their families or relatives. The defendants for the most part are the same, the following list covering the principal ones: El Paso & Southwestern Railroad Co.; Phelps Dodge Corporation; Copper Queen Consolidated Mining Co.; Calumet & Arizona Mining Co.; Shattuck-Arizona Copper Co.; Walter Douglas, president of the Phelps Dodge Corporation; M. J. Cunningham, vice-president of the Bank of Bisbee; Harry C. Wheeler, former sheriff of Cochise County; Charles W. Allen, James R. Henderson, Ben Frankenburg, Mose Newman, all prominent merchants of Bisbee; Grant H. Dowell, manager of the Copper Queen company, of the Phelps Dodge Corporation; Arthur Notman, superintendent of the Copper Queen company; L. C. Shattuck, manager of the Shattuck-Arizona Copper Co.; J. P. Hodgson, manager of the Morenci branch of the Phelps Dodge Corporation; H. H. Stout, smeltery superintendent, Douglas Reduction Works; W. H. Brophy, former manager of the Phelps Dodge Mercantile Co.; Gerald Sherman, consulting engineer, Phelps Dodge Corporation; Charles F. McDonald, cashier, Citizens' Bank & Trust Co., Bisbee; also several other prominent citizens of Bisbee.

In addition to the above civil suits, over fifty arrests of prominent Bisbee men have been made on criminal charges preferred by some of the men deported, in each case the bond being fixed at $2,000. Assistant County Attorney Roark authorized the statement that owing to the crowded condition of the Superior Court docket, together with the fact that it will take considerable time in the justice court to dispose of the cases now in progress, the state would probably await the final outcome of the present cases before filing the next list. The criminal cases will be given a preliminary hearing in the court of Justice W. C. Jacks, of Douglas, who stated his intention of trying one case a day and keeping the calendar moving as rapidly as possible, the first case to be heard on July 11.

It is understood that all of the above cases were rushed through and filed prior to July 12, 1919, thus coming within the two-year limit prescribed by the statute of limitation.

BY THE WAY

The Engineer in Civic Life

Among the engineers who have risen to distinction in civic life is Mayor Walton, of Oklahoma City, who is a consulting civil engineer. When recently a vigorous chapter of the American Association of Engineers was organized at Oklahoma City, the Mayor honored the association's national secretary, C. E. Drayer, of Chicago, by conferring a policeman's commission upon him. The club that no doubt goes with the commission can be used to remind "Monads," of the Oklahoma chapter at least, of their duties as citizens, whenever the occasion arises.

Educational Advantages

"Speakin' o' this 'ere simplified spellin' an' pronunciation, m'son," said Cap'n Dick, "reminds me o' tha time w'en Jan Tregillis made h'up 'is min' to get edicated. Jan, 'e'd never putten much stock on learnin', an' w'ile 'e nawed all baout minin' an' such 'e figgered as 'ow 'e h'ought to h'improve long lines o' readin' an' writin'. So 'e starts h'out gawin' to night school. Cordin' to 'im, 'e wuz doin' fine, an' mighty praoud wuz 'e of 'is 'eadway. One day 'e got 'old of Billy Penglase, an' sez 'e to 'im, ''Ere, Billy, this 'ere readin' is simple nuff. Naow 'ere's sumthin' in this paper that's plain as can be, an' yet I'll bet there be them chaps 'o can't make un h'out no 'ow. C-A-T. Now I naws that spells cat, an' E spells 'e, 'e cat. An' 'ere's G-O-R-Y, gory. W'y that's simple nuff; that there word spells bloody tomcat.'"

D. E. A. C.

Froth

The proposed San Bernardo mill, in San Miguel County, Col., is to be a 100-ton flotation plant, with ball mills for grinders and oil as an ore dressing, according to a local paper. A slip of the tongue, perhaps, in speaking thus of the oil used in flotation. But flotation, after all, must be a puzzling thing to the layman, and laxities of speech may be pardoned. Mother Shipman really foretold the art when she prophesied that "iron would on water float." There is a bare chance that the old lady knew more about it than she let on, and if the Minerals Separation people will hunt up the records they may be able to acquire what few remaining rights they do not already possess—with the aid of the courts, of course.

But to get back to our puzzled layman, who has always considered oil the great soother for troubled waters. How confused must he be on finding oil used in flotation with the opposite result! Here too, the law of gravitation is suspended and Sir Isaac Newton seems a faker. And about it all is a fascination that attracts layman, metallurgist, and lawyer alike.

Astrology in the Oil Fields

"Doing business by mail assures you Uncle Sam's protection," advertises the Astro Oil Association, of Fort Worth, Tex. Sometimes it also brings the Post Office inspectors down upon you, the association would do well to note. At any rate, oil geologists must get together, unionize, or do something to keep astrologers from breaking into the game and grabbing all the profits. "The ancient wise men were astrologers," runs the association's advertisement; "kings followed their counsel and successful men do so today. Professor Richard S. Bacon, famous astrologer, fully demonstrated to us his ability to locate oil pools. Our geologist has found a structure, surrounded by proven fields, and Professor Bacon says it contains oil in paying quantity. They may both be wrong, but we are betting our money they are right." The public is invited to subscribe at only $1 per share.

A Silverless Islet

Silver Islet is all right except for the silver, in the opinion of Horace V. Winchell, who takes exception to a "romantic and highly colored article" about this property on the shore of Lake Superior, which was recently published in the *Minneapolis Journal.* The impression conveyed, according to Mr. Winchell, is "one calculated to induce optimistic individuals to spend money fruitlessly in further exploration of this property." In a letter to the Minneapolis paper, Mr. Winchell describes the property briefly as follows:

The Silver Islet mine was discovered by John Morgan, one of the party of surveyors who were working under the direction of Thomas Macfarlane, a well-known geologist who had been engaged by the Montreal Mining Co. to survey and prospect that company's Lake Superior properties in 1868.

The country rock at Silver Islet and upon the adjacent mainland consists of a series of dark slates and other sedimentary rocks of Animikie series. These slates are cut by sills and dikes of basalt, a massive eruptive rock which rests in steep bluffs and escarpments around the shores and islands of Thunder Bay. The rich silver ore was found only in the basalt and in the black slate immediately adjacent thereto. It occurs in a fissure vein from 8 to 10 ft. in average thickness with occasional enlargements to 20 or 30 ft. This vein extends downward to the underlying quartzites and probably into the still deeper-lying granite. In these formations the vein is distinctly impoverished and does not carry enough value to pay for working.

I do not conceive it to be the province or duty of the newspapers to protect the careless individual from unwise speculative ventures, but, on the other hand, I question the policy which leads them occasionally to publish statements which are not only erroneous, but which may easily aid the unscrupulous promoter in parting the sucker from his wealth. The business of mining is attended with sufficient hazard, even when carried on with good judgment and understanding of all the facts which may be known, and it should not be cumbered with the additional encouragement and romance aroused in the mind of the inexperienced reader by such inaccurate statements as those above referred to.

It is the opinion of those best qualified to judge, and in possession of all the facts with reference to Silver Islet, that *the silver is not there;* that the property has been thoroughly prospected and mined, and that further attempts to operate this property have little chance of success. The mine was not extraordinary in its ore nor in the production. The dividends paid from it were probably not large, and many other properties in the United States and Canada have exceeded many times its value and production.

The article in question appeared in the Sunday magazine section of the paper named, on June 22.

Advices to Washington are that blast furnaces are being blown in in the Liége district, Belgium. Among those started are the furnaces of the Cockerill Company, at Seraing.

NEW PUBLICATIONS

International Mining Law. By Theo. F. Van Wagenen. Cloth, 5 x 7½; pp. 342. McGraw-Hill Book Co., New York, 1918.

This work on the mining laws of the world contains a mass of interesting and important information, and the reader may get an excellent idea of their characteristics and varying features. The name is a misnomer. There is no code of "International Mining Law," strictly speaking, each country having its own individual laws. The work might better have been entitled "Mining Laws: a Comparative and Historical Treatment." The author gathered this material with the idea of informing himself as to the need of revision of the Federal mining law in force in the Western part of the United States. As a result of his research, which is presented in this work, he came to the conclusion that "its fundamental principles are sound." As a whole this work is excellent, and the conclusions are justified in the main. There are some details, however, to which exception might be taken. For example, the author states that no serious effort has been made to change the American mining law for nearly fifty years. As a matter of fact, one of the most determined efforts radically to change this system was made in 1879 and 1880, when the Public Land Commission, composed of J. A. Williamson, Clarence King, A. T. Britton, Thomas Donaldson, and J. W. Powell, authorized by Congress for the purpose of reporting on all of the public land laws, made its report, which was published in 1880, and most emphatically recommended that the mining laws be radically amended.

The author also states that we have a more complete record of the ancient Spanish mining laws than has been preserved in any other part of the world. He probably had in mind the most excellent commentaries on the mining laws of Spain by Gamboa, but with the exception of this work and one or two others the literature accompanying the ancient Spanish mining law is comparatively limited. On the other hand, the ancient mining laws of the original Germanic states are embodied in a literature that is unequaled in extent and detail of treatment by any other ancient system in the world.

The author, in commenting on the pioneers who rushed to California upon the discovery of gold, also states that they "consisted mainly of American working men of *limited education* but unlimited virility and well endowed with common sense and a fundamental idea of justice." As a matter of fact, they were "educated, intelligent, civilized, and elevated men of the best classes of society" (*California Herald*, N. Y., Jan. 16, 1849). Speaking of one of the early mining conventions in which the miners made their own laws, an historian says:

"The number of talented men in this Convention was noted, although it was not unusual for such bodies in the early Fifties to be composed of men who might have sat in legislative halls with credit to themselves and all concerned"—"History of Amador County," pp. 145-146, 1881.

The author is not of the opinion that the extralateral right as developed in Germany was productive of much litigation. As a matter of fact, the extralateral right was abolished as to claims thereafter located in the various states composing Germany, beginning in the early part of the nineteenth century until 1865, when this change became universal, and the reason given for this change was that the character of the right gave rise to excessive litigation. The Germanic extralateral right, however, was much more complex and difficult of ascertainment than the corresponding right in the American mining law, and though excessive litigation has been given as a reason for the proposed repeal of the extralateral features of the American mining law, the true objection is, more properly, expensive litigation. The number of extralateral cases arising in the United States is comparatively limited when we consider the magnitude of the industry involved, and the proportion that extralateral cases bear to cases arising under other phases of the mining law is a small percentage, being only 2 or 3 per cent of the total mining litigation.

The author is not in favor of the abolition of the apex and extralateral rights doctrine, but would modify it so that the extralateral right would attach only to the vein or deposit first discovered, limiting the rights to secondary veins by vertical boundary lines. It is difficult to see wherein this change would improve the present situation, and it would certainly add materially to the amount of litigation.

In conclusion, the author feels that the American Federal mining law compares favorably with other mining-law systems of the world, and he is correct in his statement that, before attempting to repeal or modify our law as it now exists, those who advocate the change should become familiar with these other systems of mining law and their underlying principles. A woeful ignorance of results that would ensue if the law were amended as is generally suggested has been betrayed by many of those who have taken the lead in advocating a radical change in the mining law of this country.

Many well-meaning critics have recommended the outright abolition of the extralateral right and discovery features of American mining law. Those who advocate this without radically changing all our public land laws at the same time have no conception of the manner in which these laws dovetail and what a profound effect any change on the one side is going to make if those on the other side are not correspondingly profoundly modified. To wipe out the extralateral and discovery features from our law is to eliminate the major part of our mining law that exists today and to leave the field open for agricultural claimants and blackmailers, who could at once take advantage of this radical change, for it would leave the miner at their mercy.

The great difficulty with our whole system of mining law is that its framers were not prophetic enough to recognize that the only mining law which will bear the test of time is based upon a complete separation of title to mineral deposits from the title to the surface, wherever this is possible. Practically all of the mining law systems of the world have incorporated this fundamental conception. It then becomes easy to deal with agricultural and surface claimants who have no title to the underlying minerals, and who can possess only superficial deposits that cannot be dissociated from the actual surface. The extralateral feature of our mining law is practically the only attempt that has been made in our law to bring about this severance, if we except recent acts of Congress providing for the severance of the surface from underlying deposits of coal, oil, potash, and other metals and minerals. Whether it is too late at this day so profoundly to alter our mining law is a practical question that will take a Solomon to answer.

Mr. Van Wagenen's book has added materially to the information now available upon the general subject, and should be read by everyone interested in the proposed revision of our mining laws. It is also a convenient work of reference for those who have occasion to consult foreign mining laws.

WILLIAM E. COLBY.

Electric Generation and Distribution in Canada. By Leo G. Denis. Paper, 6¾ x 9¾; pp. 296, illus. Commission of Conservation, Ottawa, Canada, 1918.

Biblography of Petroleum and Allied Substances in 1916. By E. H. Burroughs. Paper, 5¾ x 9; pp. 159. Bull. 165, U. S. Bureau of Mines, Washington, D. C.

Sand and Gravel in Ontario. By A. Ledoux. Paper, 6½ x 9½; pp. 138, illus. Report of the Ontario Bureau of Mines, Vol. 27, Part 2; Toronto, Canada, 1918.

Eighteenth Biennial Report of the Bureau of Labor Statistics of the State of California, 1917-1918. Paper, 5¾ x 9; pp. 470. John P. McLaughlin, Commissioner, 948 Market St., San Francisco, Cal.

Estado Actual y Porvenir de la Industria Minera en los Departamentos del Sur. By Carlos Basadre y G. Paper, 6¼ x 9¾; pp. 64, illus. "Boletin No. 93," Cuerpo de Ingenieros de Minas del Peru, Lima, Peru, 1918.

The Evaporation and Concentration of Waters Associated With Petroleum and Natural Gas. By R. Van A. Mills and Roger C. Wells. Paper, 6 x 9; pp. 104, illus. Bull. 693, U. S. Geological Survey, Washington, D. C.

Fifteenth Biennial Report Issued by the Bureau of Mines of the State of Colorado for the Years 1917-1918. By Fred Carroll, Commissioner. Paper, 6 x 9; pp. 206, illus. Bureau of Mines of the State of Colorado, Denver, Col.

Industrial Health and Efficiency. Final report of the British Health of Munition Workers' Committee. Paper, 6 x 9; pp. 374, illus. Bulletin, U. S. Bureau of Labor Statistics No. 249, U. S. Department of Labor, Washington, D. C.

Mémoire Traitement Thermique des Obus (Application de la Méthode Taylor). By Léon Guillet. Introduction and notes by Henry Le Chatelier. Paper, 8½ x 10½; pp. 154, illus. Publication de La Revue de Metallurgie, Paris, France, January, 1916.

Third Annual Report of the State Oil and Gas Supervisor of California, for Fiscal Year 1917-1918. By R. P. McLaughlin, State Oil and Gas Supervisor. Paper, 6 x 9; pp. 602, illus. Bull. 84, California State Mining Bureau, San Francisco, Cal.

The Limestone Deposits of New South Wales. By J. E. Carne and L. J. Jones. Issued by direction of the Honorable J. C. L. Fitzpatrick, Minister of Mines. Cardboard, 5¾ x 9½; pp. 411, illus. "Mineral Resources No. 25," Geological Survey of New South Wales, Sydney, Australia, 1919.

Trautwine—The Civil Engineer's Pocket-book. Twentieth edition, revised and enlarged. By John C. Trautwine. Leather, 4 x 6½; pp. 1,528. Trautwine Co., Philadelphia, Pa., 1919.

This long-established standard handbook needs no review, as most engineers are familiar with its good features and its limitations.

Manual of the Chemical Analysis of Rocks. Third Edition, Revised and Enlarged. By Henry S. Washington. Cloth, 5¾ x 9; pp. 271. John Wiley & Sons, New York, 1919.

A selection of methods for the chemical analysis of silicate rocks, especially those of igneous origin. The book is intended for the use of chemists and petrologists.

Guía Industrial de Bilbao de 1918. Cloth, 7¼ x 10½; pp. 124, illus. Sociedad General Española de Publicidad, Bilbao, Spain.

A directory of concerns and individuals doing business in Bilbao. It includes lists of mining and metallurgical companies, manufacturers of hoisting ropes, carbide and explosives, and other materials, which will be of interest to the mining industry.

The Energy Resources of the United States: A Field for Reconstruction. By Chester G. Gilbert and Joseph E. Pogue. Paper, 6 x 9; pp. 165, illus. Bull. 102, Vol. 1, U. S. National Museum, Washington, D. C.

This bulletin deals largely with petroleum as an energy resource. For those interested in a broad treatment of the subject in its relation to the public interest there is much material of value in this publication.

The Decline and Ultimate Production of Oil Wells, with Notes on the Valuation of Oil Properties. By Carl H. Beal. 6 x 9; pp. 215, illus. Bull. 177, U. S. Bureau of Mines, Washington, D. C.

A useful bulletin which gives much needed information about the methods for estimating the future and ultimate production of oil properties and the application of these methods to oil-land valuation. Part 2 deals with the decline and ultimate production of different oil fields of the United States.

Annual Statistical Report of the American Iron and Steel Institute for 1917. Cloth, 6 x 9¾; pp. 96. American Iron and Steel Institute, 61 Broadway, New York, 1919.

An excellent statistical summary of the production of pig iron, steel ingots and castings, rolled iron and steel, tin plates, galvanized sheets, pipes, tubes, and similar forms, iron ore, coal, and coke. It is stated that the compilation of these statistics was delayed owing to special work undertaken at the request of the War Industries Board and the War Trade Board.

Iron and Steel, a Pocket Encyclopedia, Including Allied Industries and Sciences. By Hugh P. Tiemann, with an introduction by Henry Marion Howe. Leather, 4 x 6¾; pp. 514. McGraw-Hill Book Co., New York, 1919.

In the introduction to this little book Henry M. Howe says: "I commend the book without reserve to the whole family of steel metallurgists, be they millmen, metallographists, teachers or students." The book is a combination of a dictionary, a cyclopedia and a handbook and is useful as a quick reference on iron and steel.

Mineral Statistics. Paper, 5 x 8; pp. 31. Copies will be sent on request by *Engineering and Mining Journal,* 10th Ave. at 36th St., New York City.

This pamphlet is a reprint of the principal statistical tables from the Annual Review Number of the *Engineering and Mining Journal* and a few from later issues. They have been reproduced in this form for ready reference, but, in some cases, the record has been completed, which could not be done at the date of original publication, and in other instances the figures have been corrected in the light of later information.

The U. S. Geological Survey: Its History, Activities, and Organization. Institute for Government Research, Service Monographs of the U. S. Government, No. 1. Cloth, 5¾ x 8½; pp. 163, illus. D. Appleton & Co., New York, 1918.

The first of a series of monographs giving the history, development of service, functions, organization, plant, laws and regulations governing, appropriations, expenditures and other data of important governmental divisions. This particular volume gives in condensed form, suitable for convenient reference, full information about the U. S. Geological Survey.

The Design of Walls, Bins and Grain Elevators. By Milo S. Ketchum. Third Edition, Revised and Enlarged. Cloth, 6 x 8¾; pp. 556, illus. McGraw-Hill Book Co., New York, 1919.

A well-known book which has already reached its third edition. This issue contains new material on economic design of reinforced-concrete retaining walls; formulas for wedge-shaped reinforced-concrete beams; formulas for calculating the unit pressures on bin walls; the report on the design of retaining walls, adopted by the American Railway Engineering Association in March, 1917, as well as other minor additions.

Report of a Joint Committee Appointed from the Bureau of Mines and the United States Geological Survey by the Secretary of the Interior To Study the Gold Situation. 5¾ x 9; pp. 84, illus. Bull. 144, U. S. Bureau of Mines, Washington, D. C.

The findings of a committee appointed in July, 1918, by Secretary Lane to investigate the gold-mining situation in the United States. The committee consisted of Hennen Jennings, chairman; J. H. Mackenzie and Charles Janin, of the Bureau of Mines, and H. D. McCaskey and F. L. Ransome, of the U. S. Geological Survey. The bulletin will be useful to students of economics and to mining engineers.

The Weight Per Unit of Brake Horsepower of a three-cylinder vertical Diesel oil engine, as given in a catalog for several sizes, is shown in the following table:

Net Brake, Hp.	Weight Range Lb. per Brake, Hp.	Net Brake, Hp.	Weight Range Lb. per Brake, Hp.
150	446 to 533	400	390 to 525
200	420 to 510	500	405 to 464
300	400 to 530	600	386 to 500

The weights are approximate only, and the larger weight includes a heavier flywheel than the smaller.

PERSONALS

AMOR F. KEENE, of the Gold Fields American Development Co., Ltd., who was formerly associated with H. C. Hoover's and other London mining and exploration companies, has been elected a director of Johnson, Matthey & Co., Inc., recently formed to take over the business in the United States of Johnson, Matthey & Co., Ltd., of London, England, dealers in platinum and precious metals, assayers and refiners for the Bank of England, bullion merchants, metallurgists, analysts, and manufacturing chemists. Mr. Keene has also been elected a director of the South American Gold and Platinum Co. and of the American Trona Corporation.

F. F. Sharpless has moved his office from 17 Madison Ave. to 115 Broadway, New York.

John E. Penberthy, mining engineer, of Gleeson, Ariz., has returned home from a trip of examinations.

W. E. Bennet returned to New York during June after several months' trip to the properties of the Chile Exploration Co.

Thomas O. McGrath, auditor, Shattuck-Arizona Copper Co., is with his family for a month's vacation at Southern California coast points.

W. W. Thayer, secretary of California State Mining Bureau, has again taken up his duties after a three months' absence due to influenza-pneumonia.

W. V. De Camp has recently left New York to accept a position as field engineer for the Western Metallurgical Co., with headquarters at Humboldt, Ariz.

W. E. Cockfield, of the Canadian Geological Survey, and party are making an examination of the country along the Ogilvie Range, in Yukon Territory.

Lieutenant Frank G. Berton, of the Canadian Engineers, who previous to his enlistment was gold recorder at Dawson, Yukon Territory, has returned from overseas.

Harry J. Wolf has resigned as professor of mining in the Colorado School of Mines and has accepted a position on the editorial staff of the *Engineering and Mining Journal.*

Major Charles S. Haley, 521st Engineers, is expected to return from France about Aug. 1 and plans immediately to reopen offices as consulting mining engineer.

C. Carleton Semple has returned to Lima from an examination of silver-lead and coal properties near Parquin, and is now examining copper properties near Huancaya, Peru.

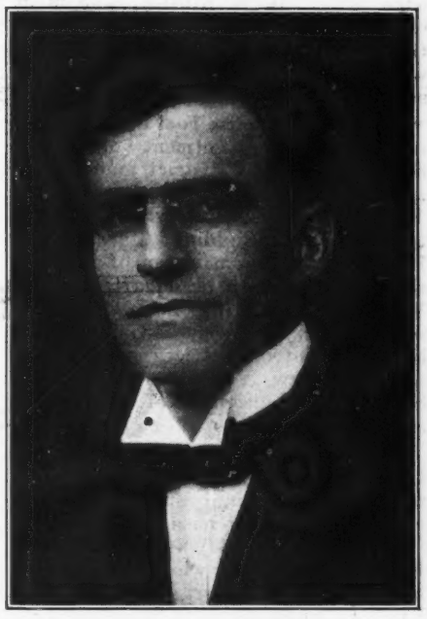
Fletcher Hamilton, California State Mineralogist, has returned to San Francisco from Sacramento, where he had been sitting on the Board of Equalization and Readjustment of Oil Correction and Review.

Edward H. Robie, formerly assistant metallurgist with the International Nickel Co., of Canada, Ltd., at Copper Cliff, Ontario, has accepted a position on the editorial staff of the *Engineering and Mining Journal.*

A. M. McQueen, of Toronto, vice-president of the Imperial Oil Co., is in Edmonton, Alberta, in connection with the extensive program of exploration now being carried on by the company in Northern Alberta.

James J. Warren, of Toronto, who has been managing director of the Consolidated Mining & Smelting Co. of Canada since 1915, has been elected president, succeeding the late W. D. Matthews. He will continue to act as managing director.

Ralph Arnold, having completed his Government service, announces the resumption of his practice as consulting petroleum geologist and engineer, with offices at Union Oil Building, Los Angeles, Cal., and 120 Broadway, New York. Cable, Ralfarnoil.



AMOR F. KEENE

Lewis A. Parsons has resigned his position as engineer of mines with the International Nickel Co., Copper Cliff, Ontario, to accept the associate editorship of the *Mining and Scientific Press,* San Francisco. **Allan F. Brock** succeeds Mr. Parsons at Copper Cliff.

Roy E. Collom, petroleum technologist, resigned from the staff of the *California Oil and Gas Supervisor,* July 1. Mr. Collom immediately entered upon similar duties with the U. S. Bureau of Mines, his present headquarters being at the Customs House, San Francisco.

Captain W. H. Wright has received an honorable discharge from the Army and will resume his former connections with the Malm-Wolf Company. Captain Wright will be engaged in the examination of mining properties in Alaska during the next two or three months.

Captain Hallet R. Robbins, Military Intelligence Division, U. S. A., formerly metallurgical engineer for the Granby Consolidated Mining, Smelting & Power Co., Ltd., has been recalled from Peking, China, where he was on duty as assistant to the American Military Attaché, for discharge from the military service.

Harold A. Linke has just returned from the coast, where he was engaged with the U. S. Housing Corporation of the Department of Labor on construction of "Vallejo Project 581," a town for civilian employees of Mare Island Navy Yard. Mr. Linke has resumed his professional practice, with office at 416 Boston Building, Salt Lake City, Utah.

G. L. Schmutz has reopened his office in Douglas, Ariz., and will conduct a general engineering business under the firm name of Schmutz & Rugen. Mr. Schmutz was efficiency engineer of the Pilares Mine of the Phelps Dodge Corporation, near Nacozari, Sonora, Mexico. **O. N. Rugen** is now serving as first lieutenant in the 301st Engineers in Germany, and expects to return soon.

Charles W. Badgley, has recently been appointed superintendent of the El Paso Smelting Works, succeeding **James Heggie,** who accepted the position of superintendent of the Verde Extension Copper Co., of Jerome, Ariz. **Paul Stein,** formerly of El Paso, but more recently of Hayden, Ariz., has been made assistant to Mr. Badgley. Mr. Stein until lately was assistant superintendent of the Hayden smeltery.

Howard I. Young, for several years manager of mines for the American Zinc, Lead & Smelting Co., for the Joplin-Miami district, has been transferred to the company's properties at Mascot, Tenn., succeeding **J. N. Houser,** who has been promoted to a position with the company at New York. Mr. Young will move from his home at Carthage, Mo., to Mascot, but will retain the management of the Joplin district operations.

OBITUARY

Samuel T. Wellman, of Cleveland, Ohio, prominent in the iron industry on the Great Lakes, died suddenly of heart disease at Stratton, Me., on July 11.

Oskar Simmersbach died in Berlin, Germany, on Dec. 14, 1918, at the age of forty-seven years. He entered the Technische Hochschule at Aachen in 1891 and later went to the Mining Academy at Berlin, where he was engaged in the study of iron and steel metallurgy. He followed blast-furnace work at the Mathilden Hütte in Harzburg and the Ponnersmarch Hütte, in Upper Silesia, after the completion of his education. Mr. Simmersbach became professor of metallurgy in 1909 in the Technische Hochschule at Breslau.

During his later years Professor Simmersbach was the author of many articles on iron and steel metallurgy published in *Stahl und Eisen*. His book "Foundation of Coke Chemistry" was published in 1895 and translated into French and English.

MINING SCHOOLS

Carnegie Institute of Technology announces the organization of a co-operative department of mining engineering. A four-year course is open to boys with a high-school education, and a two-year course, planned for the man in the mines, is open to those who have had a common-school education and two years of experience in or about mines, or in their management. The latter course will include the fundamental and elementary subjects and practical application in field work.

INDUSTRIAL NEWS

Portable Machinery Co., Inc., Passaic, N. J., has issued a circular stating that the patents of the company for the manufacture of a scoop conveyor have been infringed by a competitor.

The American Brass Co. has issued a loose leaf folder on schedules for base prices and extras for seamless tubes manufactured of brass; commercial, Tobin and phosphor bronze, and copper. Also a folder on brass, bronze, and nickel-silver sheets, wire-rods, and brazed tubes.

National Bank of Commerce, New York, has issued a statement on the "Trend of Brazil Trade," showing the increase of United States exports to that country, from $51,000,000 in 1913 to $89,000,000 in 1918. British shipments decreased from $80,000,000 in 1913 to $50,000,000 in 1918.

Edison Storage Battery Co. announces the removal of its district office in Pittsburgh, Pa., to Room 431 Union Arcade Building. The change has been made necessary by the tremendous increase in the volume of business handled through this office. The new location provides better facilities and has larger office space.

The Midwest Engine Co., Indianapolis, Ind., announces the appointment of B. H. Downing as eastern sales manager, with offices at 111 Broadway, New York, where he will have direct supervision over all sales in the Eastern and Atlantic Coast states on Diesel and oil engines, steam turbines, and centrifugal and reciprocating pumps.

War Department, office of ordnance district chief, offers for sale a quantity of building brick, now in storage at the Manchester plant, Laclede Gas Light Co., St. Louis, Mo. The following are the approximate lots: Hard red facing brick, 160,000 and 130,000; salmon-colored soft, 92,000. Quotations are requested on material f.o.b. Manchester plant.

A. J. Meier & Co., industrial engineers, Boatmen's Bank Building, St. Louis, Mo., issues a summary of the reports and data on the manufacture of lithopone, which includes the process and properties of the Collinsville Zinc Corporation. A discussion of the mining properties situated near Moselle, Mo., with estimation of available ore suitable for lithopone manufacture, is appended.

The Cutler-Hammer Mfg. Co., of Milwaukee, recently opened an office in Detroit, situated at 905 Kresge Building, to expedite the handling of orders and to give the company's customers in and about Detroit better engineering service. This office is a branch of the Chicago office. H. S. Kinsley, who is in charge at Detroit, has with him C. W. Greenman and M. Dugliss, both of whom were recently mustered out of service.

Chicago Pneumatic Tool Company announces the appointment of L. C. Sprague, formerly district manager of sales at New York, as manager of Western railroad sales, with headquarters at Fisher Building, Chicago, and H. G. Barbee as manager of Eastern railroad sales with headquarters at 52 Vanderbilt Ave., New York City. Nelson B. Gatch, formerly at Chicago, has been appointed district manager of sales at New York, succeeding Mr. Sprague. Announcement of Mr. Gatch's successor at Chicago will be made later.

Mark R. Lamb, who has recently returned from a four months' commercial trip through Europe, has just completed the purchase of a controlling interest in the New York Steel Exchange, Inc., with which will be combined his own export business. Mr. Lamb's foreign connections were largely in South America, until his recent opening of a branch office in Paris. This office will be in the Eclair Building as soon as that new office structure (the only one in Paris) is ready for occupancy. Mr. Lamb has taken the management of the enlarged company.

TRADE CATALOGS

Carbo-Hydrogen Apparatus. The Carbo-Hydrogen Co. of America, Benedum Trees Building, Pittsburgh, Pa. Catalog; 6¼ x 9; 27 pp.; illustrated. Describes the use of carbo-hydrogen apparatus for cutting steel and wrought iron.

Stationary and Portable Air Compressor Equipments. Allis-Chalmers Manufacturing Co. Bulletin 1,105; 8 x 10½; 8 pp.; illustrated. Descriptive of electrically driven air compressors built in two capacities—100 cu.ft. and 150 cu.ft. piston displacement.

Jeffrey Standard Apron Conveyors. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog 258; 8½ x 11; 74 pp.; illustrated. A general discussion is given in the first pages on the subject of handling material mechanically with standardized units. Twenty-one pages of tabled specifications are included on standard steel and wood apron conveyors, which should prove generally valuable to engineers. The many excellent illustrations showing adaptations of these machines to a wide range of materials and conditions convey considerable information.

NEW PATENTS

U. S. patent specifications may be obtained from the *Engineering and Mining Journal* at 25c each.

Aluminum and Uranium Alloy. Louis Fenn Vogt, Washington, Pa., assignor to Standard Chemical Co., Washington, Pa. (U. S. No. 1,304,224; May 20, 1919.)

Briquetting Apparatus and Process. Fred Allen Jordan, Sellwood, Ontario, Canada, assignor to Moose Mountain, Ltd., Sellwood, Ontario, Canada. (U. S. Nos. 1,304,185 and 1,304,186; May 20, 1919.)

Cable Splice. Newton K. Bowman, Canton, Ohio, assignor to the American Mine Door Co. (U. S. No. 1,304,534; May 27, 1919.)

Concentrates—Process of Treating Concentrates. Walter G. Swart, Duluth, Minn., and Bethune G. Klugh, Anniston, Ala. (U. S. No. 1,303,411; May 13, 1919.)

Converter—Automatic Tuyere Cleaner for Metallurgical Converters. Charles J. Arch, Douglas, Ariz. (U. S. No. 1,303,755; May 13, 1919.)

Drill-Steel-Pinning Device. Jesse Ditson, Littleton, Col., assignor to the J. Geo. Leyner Engineering Works Co., Littleton, Col. (U. S. No. 1,306,106; June 10, 1919.)

Electric Furnace. Ivan Rennerfelt, Djursholm, Sweden. (U. S. No. 1,305,-167; May 27, 1919.)

Flotation of Minerals. Clement Linwood Perkins, Pittsburgh, Pa., assignor to Metals Recovery Co., New York, N. Y. (U. S. No. 1,302,966; May 6, 1919.)

Thorium—Recovery of Thorium. Lonnie W. Ryan, Chicago, Ill., assignor to Lindsay Light Co., Chicago, Ill. (U. S. No. 1,307,153; June 17, 1919.)

Thorium — Treatment of Thorium Fluoride. Lonnie W. Ryan, Chicago, Ill., assignor to Lindsay Light Company, Chicago, Ill. (U. S. No. 1,307,-152; June 17, 1919.)

Zinc—Method of Handling Anodes in Electrolytic Baths. Heber M. Stuart, Baltimore, Md., assignor to Electrolytic Zinc Co., Inc., New York, N. Y. (U. S. No. 1,299,519; Apr. 8, 1919.)

Smoke—Metallurgical Smoke Filter. William H. Bates, Jr., Boston, Mass. (U. S. No. 1,302,281; Apr. 29, 1919.)

EDITORIAL CORRESPONDENCE

Current Events and Topics in Brief of Interest to Engineers and Operators

SAN FRANCISCO, CAL.—July 10

The War-Minerals Relief Commission reached San Francisco July 5. Hearings for chrome, manganese, tungsten, and pyrite producers are being held daily in the Post Office Building. At present 83 claims for reimbursement are listed, but this number will probably be considerably increased, and the commission expects to remain here for at least three weeks.

The Big Hill Mining Co., a California corporation, is preparing for extensive development of three of the important properties in the Cove mining district, in Southern California. The active operation to follow development and installation of modern machinery will lead to a revival of productive mining in the district, which is among the oldest deep mining districts in California. The properties optioned by the Big Hill company are the Lady Belle, Bull Run, and Jeff Davis, all of which were producers more than thirty years ago, and one of which, the Jeff Davis, as far back as the middle 60's. The production of the district in the thirty years of active life up to 1893 totaled several million dollars from a depth not greater than 400 ft.

The Cove district is in Kern County, forty-two miles by wagon road north of Caliente, at an average elevation of 3,000 ft. The formation is granite and slate, the granite predominating. Nine ledges or lodes can be traced by bold croppings. The main lode is the Sumner, having a general width of 150 ft., and produces large tonnages of milling ore. The Bull Run, Jeff Davis, and Lady Belle veins have a length of 300 to 900 ft., the oreshoots being 12 in. to 2 ft. wide, carrying high-grade ore from $35 to $100 per ton. These mines are situated about one-half mile north of Kernville, which is about forty miles in direct line northeast of Bakersfield. The district is well supplied with water from Kern River. The Southern California-Edison Co. diverts water from this stream at Kernville for generation of electricity. The Big Hill Mining Co. has water rights capable of providing ample hydro-electric power for mining and milling. The present equipment consists of hoists, Cameron pumps, an assay office, and other surface buildings, which will be supplemented by additional modern equipment as development and operation may demand. The district has been comparatively quiet for several years, but the owners of the various mines are only awaiting the initial undertaking of a corporation provided with the means to mine on a commercially profitable scale. There is no question as to orebodies. It is merely a matter of adopting modern methods in mining and ore treatment. There has been a recent revival of gold mining all through the state in the last few months. Unless the strikes for increased pay of miners in the Nevada County districts spread to other parts of the state, the prospect of a large increase in gold production in the south as well as in the north is thought to be favorable.

Directors of Twenty-One Mining Co. have been vindicated by the final decision of the Superior Court of California. Judge Thomas F. Graham signed the judgment in their favor, reversing a former finding in favor of the plantiff, Flinn. At the first hearing the latter testified he had paid $25,000 for an option on property, purchase price to be $250,000, and charged that F. M. Phelps had salted the samples, upon the discovery of which he demanded his money back. Judge Graham ruled that Flinn was entitled to recover. The defendants were granted permission to work the mine by the Federal District Court and uncovered a vein from which $200,000 in gold was taken. Upon this showing was based the second decision. The $25,000 paid for the option remains with the defendants. The defendant has a right, it is stated, to complete the purchase, but without title to the $200,000 already removed.

SPOKANE, WASH.—July 11

Idaho Mine Owners' Association has joined the recently organized Silver Producers' Association. Ravenel Macbeth, secretary of the Idaho association, said in Spokane recently that it was his belief that the new organization will be able to keep the control of the price of silver in New York instead of in London. He said, "The prevailing belief that the price of silver will remain up has resulted in a great impetus to silver mining, and there is a revival in the early-day silver camps of southern Idaho, with many inquiries for properties."

Prospectors are expected to take advantage of the new Indian appropriation act and get on to the Indian reservations of Washington, especially the Colville and Spokane reservations, where there are known gold, silver, copper, tungsten, and other mineral resources.

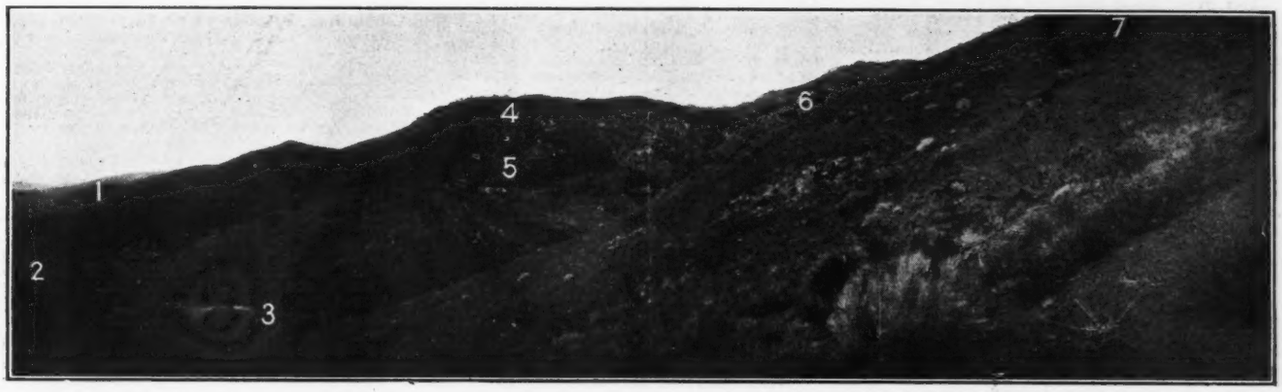
WALLACE, IDAHO—July 10

The Five-Day Strike as a protest against the trial and conviction of Mooney did not materialize in the Coeur d'Alene district except at Mullan, where a number of I. W. W.s were employed at the Morning, Hunter, and National mines. The strike was limited to members of that organization, which is chiefly made up of Finns, with a few professional agitators. The total number who went out was probably not more than 200, and a notice signed jointly by the operating companies was promptly posted to the effect that all employees who failed to report for work on July 7 would receive their time. The managers have gone further and announced that no member of the I. W. W. will be employed. As a consequence, there has been an exodus of the I. W. W., most of them going to Butte. All other operators in the district have followed the lead of those at Mullan.

BOISE, IDAHO—July 10

The Gold Hill & Iowa Mine, at Quartzburg, Idaho, forty miles northeast of Boise, controlled by the Boston & Idaho Dredging Co. interests, is working 100 men. Recent development has demonstrated the virtue of careful geologic study of the deposits, which has resulted in finding virgin orebodies of better grade than formerly. The milling capacity has been increased from 50 to 100 tons per day. A cyanide plant is now being installed to treat the concentrates by a process worked out by F. C. Brown, a local cyanide engineer. A good recovery is expected on $50 to $100 concentrates, about five tons of which is being produced per day. At present this is being shipped to the Salt Lake smelters at a high freight and treatment charge. This is the oldest gold-lode mine in Idaho, and has been successfully operated for the last fifty-four years, with a total output of between three and four million dollars and a maximum depth of 550 ft.

The I. X. L. group of copper claims, in Washington County, taken over last autumn by local wool growers, has since been under development and now has an 800-ft. crosscut tunnel penetrating a flat-dipping zone of quartz monzonite with primary chalcopyrite, the sulphides com-



COVE MINING DISTRICT, KERN COUNTY, CALIFORNIA, LOOKING NORTHWEST FROM RED HILL. 1, CONTENT; 2, PEARSON'S GULCH; 3, SUMNER GULCH; 4, LADY BELLE; 5, SHAFT; 6, LODE; 7, RED HILL

ing practically to the surface with no important zone of oxidation. The last 400 ft. of the zone passed through by this company's crew, as reported by conservative samplers, gives an average value of 1½ per cent copper, with 50c. gold and silver per ton. The prevailing sulphide is soft high-grade chalcopyrite, with chalcocite facings. As the zone is penetrated the mineral formerly segregated on cleavage lines becomes more disseminated in the grain of the rock and mixed with magnetite and marcasite. The conditions suggested magmatic diffusion and segregation of primary copper sulphide, and at the present stage of the development indicate a new type of porphyry copper deposit of some magnitude, there being two distinct zones of mineralization on the property, 500 and 800 ft. wide, respectively, and a mile long.

SALT LAKE CITY, UTAH—July 11

Mineral Locations totaling 2,373 were made in Utah in 1918, according to the report of the Surveyor General for the state. Since the first of the year there have been 482 applications for mineral survey.

Utah's Production of Primary Copper in 1918 was 230,964,908 lb., compared with 227,840,447 lb. in 1917, making it fourth in the list of copper-producing states, as it was in 1917. Preliminary figures to this effect have just been issued by the U. S. Geological Survey.

PHOENIX, ARIZ.—July 11

The Arizona System of Assessment of "intangible assets" has been sustained in the State Supreme Court, in its reversal of a judgment of the Gila County Superior Court in favor of the Inspiration Consolidated Copper Co. and the International Smelting Co. In the case of Inspiration there had been paid, under protest, $624,224 in tax money, on a gross assessment of $74,146,807. An order of the local Superior Court cut the assessment down $18,000,000, representing $130,000 of the sum claimed by the county and state. In the Supreme Court two justices sustained the contention that the State Tax Commission had full power in the matter, a third justice dissenting, on the ground that the county assessment could not be changed by the state. The suit was of the greatest importance, vitally affecting the claim of the Tax Commission that assessments might be based upon the profits of mines, and not wholly upon the apparent value of the mining property and improvements.

BISBEE, ARIZ.—July 10

The Copper Queen, at Bisbee, has decided to keep the "Warren District Practical Mining Course" open during the summer months, on account of the interest that is being taken in it by the employees. So much time was lost during the influenza epidemic, that the work fell considerably behind schedule. The course is open to all employees, and offers them a definite road to promotion that can be taken irrespective of previous education. It consists of forty-four lessons, each given by a specialist in the subject, and each lecture printed and distributed free of charge. The subject matter covers a large range, being a complete semi-technical course in mining, designed particularly to fit miners to be shift bosses and foremen. It is so arranged that a man may start any time. The course has been very successful thus far, even though it has not completed its first year.

OURAY, COL.—July 10

American Smelting & Refining Co. has taken over the famous old Revenue tunnel and allied properties, in the Sneffels district, and is starting development work by letting contracts for drifting on the several veins. The property is owned by A. E. Reynolds, of Denver, well-known Colorado operator, who has been working the mine in a small way in recent years. The combined properties have yielded about $16,000,000 in silver-lead ore, most of which came from the old Virginius. The veins are closely allied with the Mountain Top, Atlas, and Tomboy veins, which properties surround the Revenue. Adequate development is sure to revive the property, and the finding of ore will be of great interest to the district, and particularly the neighboring mines, stimulating development at lower horizons. The other mines are all taking out good ore at higher altitudes, and all are sinking or preparing to sink for development at lower levels. The Revenue group has been a great producer of rich shipping ore, but this was always accompanied by milling ore in quantity. The opening up of present known reserves of milling ore, and the finding of new ore, will no doubt call for the erection of a milling plant, as the old plant burned some years ago.

The Camp Bird company is driving a raise to connect its drift on the vein at the new crosscut tunnel level with the bottom level of the old workings. This raise will soon be completed and ventilation and drainage accomplished. Meanwhile, some development is going on at the tunnel level, but this work is held in abeyance, pending completion of the raise.

AUSTIN, TEX.—July 10

The Appropriation Bill passed by Congress July 1 is of special interest to Texas oil companies, as it carries with it an appropriation of $25,000 to the Bureau of Mines to be spent in special expert investigations in the Texas oil fields, with a view to instituting more economic methods of producing and handling oil; and also for special reports on the Texas output, separating the Texas production figures from the statistics of the mid-continental reports.

Simms Petroleum Co., organization of which has recently been announced, will own all the stock, except the directors' qualifying shares, of the Simms Oil Co., of Texas. It will be incorporated under Delaware laws for 500,000 shares, of no par value. Of this amount 425,000 shares will be issued at once. Officers are E. F. Simms, president, now vice-president of the Sinclair Oil Co., and Harry Bonner, chairman of the board of directors, now president of the Missouri Pacific Ry. This corporation, through its operating subsidiary, the Simms Oil Co. of Texas, holds leases in twenty counties of Texas, many of them covering portions of the Ranger field and its extensions.

A Temporary Restraining Order was obtained by the State of Texas from Judge George Calhoun, of the 55th District Court, against J. L. Schnakenberg and thirty-five others from trespassing upon a fifty-two-acre tract eighteen miles northwest of Wichita Falls, Tex., and from erecting derricks thereon or attempting to drill for oil or gas. It is alleged that the state, through its Commissioner of the General Land Office, J. T. Robinson, on May 12, 1919, issued a permit to George W. Butler and A. S. Newberg to prospect for oil and gas on a one-eighth royalty basis, and that the defendants have prevented the lessee by threats of violence from erecting derricks and proceeding with prospecting work. Among the defendants, it is stated, are agents or trustees of the United Southern Oil Co. No. 2; Pennsylvania Oil Companies Nos. 1, 2 and 3; and the Sky Line Oil Co. In addition to suit to try title, the state sues for $100,000 damages.

JOPLIN, MO.—July 12

The Golden Rod M. & S. Co. is making extensive improvements at its properties at Picher, Okla. The No. 4 mill, which originally had a capacity of 700 tons daily, has been enlarged until it can handle 1,200 to 1,500 tons in twenty hours. The recent installations include another set of crushers and rolls, two large chat jigs, additional sludge tables, and a Dorr thickener to work in conjuncton with two Picher-Denier flotation machines. The mill will treat material from five different shafts, being brought to the mill by the surface railroad. The company also recently completed its No. 5 mill, and from this and the No. 4 it expects to make an extraction of from 85 to 88 per cent. During the last year the Golden Rod company produced 13,896 tons of zinc ore and 2,260 tons of lead ore. F. C. Wallower is general manager, and Edgar Z. Wallower, president.

A Tri-State Geological Office has been established at Joplin, Mo., and has been opened under the personal management of H. A. Buehler, State Geologist for Missouri, with W. E. Pond, geologist, in charge. The office is the joint creation of state geologists Buehler, for Missouri; Shannon, for Oklahoma; and Moore, for Kansas, and is intended to extend accommodations to persons interested in any part of the Joplin-Miami zinc and lead district. General information on operations and activity in the field is to be obtainable at the office, and other information concerning drill records and ordinary geological structure. In addition, the three state geologists are planning to prepare jointly a map of the district made on a scale of four inches to the mile, which will be comprehensive as to small surface detail. A map on a scale of one inch to the mile was started by Mr. Buehler about four years ago, but this was found too small, and the bigger map was decided upon.

HOUGHTON, MICH.—July 14

The Announcement by Calumet & Hecla and subsidiaries, on July 7, that all working mines would immediately begin to take back their underground men who had been laid off, was generally hailed with pleasure throughout the district. The properties that are increasing their underground forces also include the Quincy, Mohawk, Champion, Trimountain, and Baltic. These companies, as well as Wolverine, did not lose many employees during the winter and have been steadily taking on men for the last month, though without recruiting.

BIRMINGHAM, ALA.—July 12

The Increase in Iron Production in the Alabama district for June shows about 137,700 tons, against 133,000 in May, thus bearing out early June expectations of some gain over May. This increase, though not large, indicates the upward swing in production. July should show considerable gain over June and may equal February's showing of 188,700 tons, the largest tonnage for any single month in 1919.

Several of the larger companies are considering the blowing in of additional furnaces in the next two or three months, owing to the stronger demand for iron and promise of higher prices. The Republic Iron & Steel Co. blew in one of its two idle stacks at Thomas, Ala., during the second week of July. At the same time the company began operations at the No. 1 mine of its Spaulding group. Further widening of operations is noted in that mining was begun at the company's Alfretta mines during the first part of July on a contract basis. The Gadsden furnace of the Gulf States Steel Co., at Gadsden, Ala., is expected to begin operations this month; also one of the furnaces of the Sloss-Sheffield Steel & Iron Co.

The Tennessee Coal, Iron & R.R. Co. is said to have purchased considerable land at Brown's Station, near Bessemer, and directly on the right of way of its proposed cable tramway from Red Mountain Top to its mills and furnaces at Ensley and Fairfield. This undertaking would be one of the largest single enterprises attempted in the district. The labor situation on Red Mountain shows a slight improvement over that of the last two or three weeks.

VICTORIA, B. C.—July 11

Employees of the Granby Co., which recently closed down its smeltery at Grand Forks, and its mine at Phoenix, are being offered free transportation to Anyox as well as employment there. At Phoenix business men are professing the optimistic belief that "Phoenix will rise again from its Granby ashes." The Granby company's report for the year ended June 30, 1918, stated that ore remaining July 1, 1918, totaled 3,032,532 tons, of which 2,824,579 tons was regular grade and the remainder low grade. It also stated that the entire area had been well prospected, so that exploratory work was limited. Total shipments in year covered by report were 542,532 tons. Assuming that this amount was extracted in the year just concluded, there must therefore remain in reserve about 2,500,000 tons. This, although the chance of developing new bodies seems slight, leads some to believe that operations may again be resumed, perhaps by another company.

TORONTO, ONTARIO—July 12

Employees of Cobalt Mines will get a further bonus of 25c. a day owing to the fact that silver averaged slightly over $1.10 per oz. during June. Although the mine managers were under no obligation to pay a bonus after silver reached 80c. per oz. they have adopted and maintained the policy of paying a bonus of 25c. a day for each 10c. advance over 60c. per oz.

The Pas District is making more rapid progress in mining than any other section of the province, according to Dr. R. C. Wallace, commissioner for Northern Manitoba. Prospecting is now general throughout the northern belt, the prospectors distributing themselves over a wide area. There has been a marked inclination to go further afield on the Hudson Bay Ry. as far as the first crossing of the Nelson River and even further, showing that the railway is an incentive to the development of the north. The greatest interest centers around Athapapuskow Lake. Since last Autumn there have been two discoveries on the western part of that area in the belt in which lies the Flin Flon deposit. At the north end of the northeast arm of Schist Lake Peter Davidson made a discovery of high-grade chalcopyrite ore occurring in stringers on the surface, but showing promising indications of width at a depth of 6 ft. Samples show a mixture of chalcopyrite and pyrite, with copper content considerably less than the best Mandy values, but sufficiently high to represent good profits if the orebody proves fairly large. The discoverers of the Flin Flon property have uncovered high-grade copper ore on the east side of the middle arm of Schist Lake some few miles east of the Mandy. The copper content compares favorably with Mandy ore, but little development work has been done to ascertain the size of the orebody.

SAN MIGUEL, COLOMBIA—May 24

Law Prohibiting Export of Gold enacted at last year's session of Congress of the United States of Colombia, was recently put into effect. It is thought, however, that it will make little change in the production of the metal, as low exchange (84 to 86 per cent for dollars) stopped exportation of gold long ago.

At El Recreo, J. F. Dierolf reports a new strike on one of his prospects, apparently a shear zone 20 ft. wide with an amphibolite footwall and a chlorite schist hanging wall. Quartz is abundant, crossing from foot to hanging in stringers and lenses, the schist between stringers being sericitized and containing scales of bright green mica, a favorable sign in Recreo orebodies. The iron-stained character of the quartz indicates primary mineralization, but primary sulphides are thus far lacking. Pyrite and arsenopyrite appear in the sericite schist. Gold is present in commercial quantity, some specks also being seen in the quartz. Ore is apparently partially leached and a rich secondary deposit is looked for.

THE MINING NEWS

Progress of Mining Operations Condensed and Classified for Easy Reference

ARIZONA

Cochise County

CALUMET & ARIZONA (Bisbee)—Production of copper in June was 4,872,000 lb., of which 4,142,000 was available for company.

DRAGOON MOUNTAIN (Johnson) — To build concentrator.

KEYSTONE COPPER (Johnson)—Planning 100-ton flotation mill. Property developed to 635 ft. depth. Ore mainly sulphide, with some oxide on sixth level. H. W. Miller president and manager.

Gila County

SUPERIOR & BOSTON (Globe)—Assessment of $1 per share, payable Aug. 8, stock of record July 19. Property examined by C. W. Botsford, who recommends diamond drilling from lower levels in search of Old Dominion vein in schists where commercial primary ore is hoped for. Crosscutting to south on 300 level to cut veins in that section, and drifting east on 1200 level to locate intersection of Old Dominion and Great Eastern veins beyond Quo Vadis fault. Fire that started on 800 level bulkheaded off by Old Dominion helmet men.

INSPIRATION (Inspiration) — Copper production in June, 6,300,000 lb.; May, 6,200,000; June, 1918, 10,300,000 lb.

Greenlee County

ARIZONA COPPER (Clifton)—Copper production for June was 2,400,000 lb.

Mojave County

UNITED EASTERN (Oatman) — Main shaft below 1,500 ft., to be sunk to 1,600, reaching greatest depth of district. Orebody crosscut on 1,400, with same values as on 665 level.

Maricopa County

RED ROVER (Phoenix)—Electric equipment installed and large concentrator planned to handle copper and silver ores developed on three levels. Development to be extended from 500 to 1,000 level. Property, fifty miles northeast of Phoenix, owned mainly by F. A. Gillespie, of Tulsa, Okla., with B. A. Gillespie manager.

Pima County

NEW CORNELIA, (Ajo)—All machinery on hand for new test of flotation mill to be in operation at early date. Ore in leaching beds now given additional washing, five in all, with material increase in copper saving. Two large towers added for reduction of ferric iron by sulphurous acid gas, doubling capacity in this respect. Plans being made for washing of tailings dumps of 3,000,000 tons, with expectation of precipitating 1,000,000 lb. of copper. Production of copper in June was 3,440,000 lb., of which 2,708,000 lb. was cathode; 250,000 smelting ore, and 482,000 cement copper.

Pinal County

RAY CONSOLIDATED (Ray) — Copper production in June was 3,890,000 lb.; May, 3,975,000.

SILVER KING OF ARIZONA (Superior)—New three-compartment shaft being sunk at rate of about 5 ft. per day. Will go to 1,000 ft. and at 600 level will crosscut to orebody to prospect ground below 400 level, which has been under water for many years. Mill of 25-ton capacity making high-grade concentrate from 40-oz. silver ore coming from old shaft. Flotation giving 95 per cent recovery. New headframe shown in accompanying cut.

Yavapai County

GRAND ISLAND (Jerome)—Diamond drilling resumed. First drill working from main shaft on 500 level. Hole expected to cut vein outcropping on company's Arizona Girl claim. Will drill two other holes on same level north from main shaft toward adjoining Shea property.

Yuma County

SWANSEA CONSOLIDATED (Swansea)—Thirty miners working on development. Flotation mill of 250 tons' capacity installed.

CALIFORNIA

Calaveras County

MORGAN MINE (Carson Hill) — Rich ore going to mill from 200, 300, 500, and 675 levels. Monthly average approximates $60,000. Being operated by Carson Hill Gold Mining Co., which is also developing group of claims on south side of Carson Hill.

Inyo County

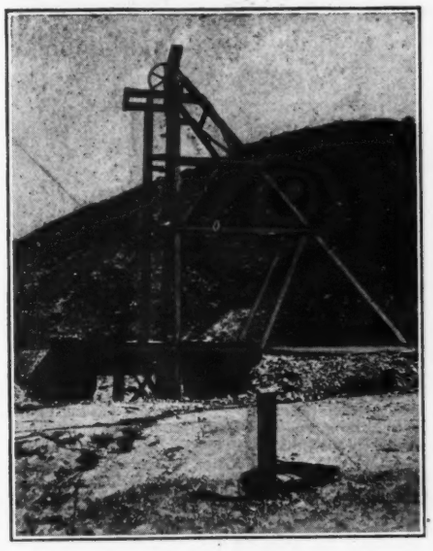
BELMONT (Keeler)—Owned by W. L. Hunter, has been leased to syndicate headed by General Strong, late Commandant at Camp Kearny, and General Breckenridge, who are now equipping property for extensive working.

Kern County

SILVER DISCOVERY near Randsburg reported to show excellent mineral values. Two carloads shipped to Selby smeltery, first averaging $45 per ton. Property near railroad and paved highway.

Nevada County

WILLIAMSON BROS. and C. Cole, of Washington, Cal., hauling 40 per cent chrome ore to Nevada City for shipment east. Grade said to yield owners fair profit.



NEW HEAD FRAME AT SILVER KING OF ARIZONA PROPERTY, SUPERIOR, ARIZ.

P. BOKAY developing Bokay Bonanza and Monte Carlo claims. G. G. Gates, of Oakland, Cal., examining Excelsior and Bokay holdings.

IDAHO-MARYLAND (Grass Valley)—Machinery being overhauled preparatory to unwatering and exploring lower levels. Will work South Idaho adjoining.

SULTANA (Grass Valley)—Not to be closed on account of partial flooding during recent strike. Water being lowered rapidly.

UNION HILL (Grass Valley)—Will be closed and plant dismantled. Mine damaged by flooding. Future operations will be through new shaft. Property part of Idaho-Maryland group.

MOUNTAINEER MINES CON. (Nevada City)—Ray C. Rossen, commissioner appointed by Superior Court of Nevada County, authorizes sale on Aug. 12 of all holdings of company to satisfy judgment for over $151,000 obtained by Peter Bender, of Santa Clara County, on July 2. Property west of Nevada City and includes about 30 lots and patented quartz claims.

MURCHIE (Nevada City)—Clear title obtained by R. E. Steele, owner, when bid in for delinquent taxes.

Plumas County

ENGELS COPPER (Engels)—Examination recently completed by engineers for D. C. Jackling.

Shasta County

UNITED STATES (Kennett) — Mammoth smeltery produced no copper in June, owing to mine and smeltery being closed during month. Plant still down.

Sierra County

TABLE ROCK (Sierra City) — Has broken into gravel at end of 3,000-ft. tunnel. Gold coarse and heavy. Runs $85 per five feet of drift.

COLORADO

Boulder County

SMUGGLER M. & M. (Jamestown)—Another carload of gold ore shipped, coming from oreshoot on new vein parallel to Smuggler vein. Driving crosscut from 200 level west to cut new vein showing on surface.

Gilpin County

GREGORY BUELL stamp mill in Central City leased for three years to Fuller MacCulloch, operating Becky Sharp and other properties in Russell district.

CORNUCOPIA (Apex) — Extensive development and milling program awaits report of George E. Collins, of Denver.

SACO DE ORO (Apex)—Air compressor, drill sharpener, and other equipment recently shipped to property.

Montrose County

RADIUM ORE SAMPLING (Montrose)—O. Barlow Willmarth, manager, paid $1 per lb. for 75 lb. high-grade carnotite ore in Telluride recently.

San Miguel County

TELLURIDE ORE SHIPMENTS for June totaled 109 cars. Tomboy shipped 60 cars to Durango; Smuggler, 25 cars to Durango and 20 to Pueblo; John G. Wagner, 2 cars of concentrates from the Cimarron; and Liberty Bell, 2 cars of concentrates.

VALLEY VIEW LEASING & MINING (Ames)—Company which took over San Bernardo mine last year plans to equip 100-ton flotation plant at once, to be designed by Walter L. Reid, mill superintendent of Smuggler Union company. Mill will be erected on Matterhorn side of railway at Yellow Mountain. Small force engaged for year retimbering and widening tunnels, tracks and chutes. Considerable good ore blocked out. Will ship ore recently cut in tunnel on 4th level to Durango smeltery. Company also owns property on Yellow Mountain adjoining Silver Bell and Caribou mines, on which several veins of milling ore have been cut. Will start new tunnel on San Bernardo 200 ft. below lowest workings to cut vein in good ore. Otto Beselack, of Ames, Col., president and manager.

Summit County

BEMROSE-BOSTWICK (Breckenridge)—Placer in Hoosier Gulch operated under lease with good results. Pay gravel overlain with black muck that must be worked off before giants can work effectively.

CARBONATE (Breckenridge) — Several carloads of sorted lead carbonate ore ready for shipment. Property under lease and option to Samuel Klous and others, of Boston.

POWDER RIVER GOLD (Breckenridge)—Handling 4,000 cu.yd. daily of Blue River's placer deposit on B. & L. placer. Deposit 48-55 ft. deep. Gold becoming coarser upstream.

Teller County

REVA GOLD (Cripple Creek)—Company, operating Rose Nicol mine, has cut five-foot orebody on main Rose Nicol vein on 8th level, connected with 1,000 level of No. 2 shaft of Portland Gold Mining Co.

STRATTON ESTATE (Cripple Creek)—F. M. Kurie, operating through Star of Bethlehem shaft, is mining good ore from blocks leased on Shurtloff, one carload bringing settlement of $61 per ton.

IDAHO

Shoshone County

MARSH (Burke)—Statement just issued shows tangible assets $18,168. Company has few men employed doing surface exploratory work, which will be followed by development from main tunnel. Shaft abandoned for present, and no further work will be done in it until orebody has been opened above.

SHERMAN (Burke)—Final payment of bond on old Union group made this week. Total amount of bond $150,000. Originally held by Sherman Development Co. Control sold to Days, one of the terms being payment of balance due under bond. New company organized called Sherman Lead Co. Ore developed in two tunnels, and another tunnel being driven 600 ft. deeper. Considerable ore encountered, but main shoot not yet reached. Ore, lead-silver and zinc.

BUNKER HILL & SULLIVAN (Kellogg)—Only one furnace at smeltery running last few months, but announced that second will soon start. Plant has four furnaces.

SUNSHINE (Wallace) — Absorption of Sunset Banner group of claims by Sunshine Mining Co. completed this week, when stockholders of Sunset company received stock for original holdings on basis of one share of Sunshine for four shares of Sunset Banner. Properties adjoin on Beaver Creek. Sunshine will soon start crosscut to explore ground at depth.

KANSAS

Joplin-Miami District

EMPIRE DEVELOPMENT (Miami, Okla.)—Completing jig plant at mine near Hockerville. Crusher and rolls to be operated by electricity.

MICHIGAN

Copper District

CALUMET & HECLA (Calumet)—Copper production in June was 5,439,761 lb. Ahmeek produced 700,232 lb.; Allouez, 138,340; C. & H., 3,221,220; Centennial, 87,900; Isle Royale, 655,400; La Salle, nil; Osceola, 603,569; and Superior, 33,100. Calumet & Hecla and Mohawk-Wolverine announced wage increase of 15% on July 15.

VICTORIA (Victoria) — Stamped 6,425 tons in June, recovering 137,077 lb. copper, including mass. Pounds ingot per ton of rock estimated at 14.4. Has not shipped any copper to smeltery since February.

Gogebic Range

DAVIS (Ironwood)—Repairs to shaft, which was burned out four months ago, completed down to 16th level, below which little damage was done. Fire stopped all pumping, and water has risen about 500 ft. in shaft. After this is removed new and larger pumps will be installed on 24th level to handle large flow of water which may be encountered as development work approaches Newport mine. Electric-driven pumps will probably be used.

NEWPORT (Ironwood)—Explanation of recent general inventory of this and Anvil mine by outside experts may be found in statement coming from Milwaukee office that Newport Mining Co. has joined new combine which will manufacture tubes and other steel products. No changes in local management expected.

PABST (Ironwood) — Development at new vertical shaft will be suspended for week or more, owing to burning out of bucket-hoist motor. Water being kept down by bailer rigger on cage. Crosscut 8 x 15 ft. in granite on 24th level of this shaft, driven 145 ft. in June, by three shifts of ten men each. This month better progress being made, with shoveling machine and seven men per shift.

PURITAN (Puritan)—Mine shut down for week while repairs are made to wooden headframe.

MINNESOTA

Cuyuna Range

THOMPSON (Crosby)—Mine not shipping and practically all ore removed. Originally operated as underground mine, then stripped and milling used. Photograph shows typical formation of Cuyuna Range orebodies.

MISSOURI

COLLINSVILLE ZINC CORP. (St. Louis)—Formed to convert part of smelting capacity of Collinsville smeltery at Collinsville, Ill., to make lithopone. Has issued $500,000 of bonds and 10,000 shares of stock of no par value.

MONTANA

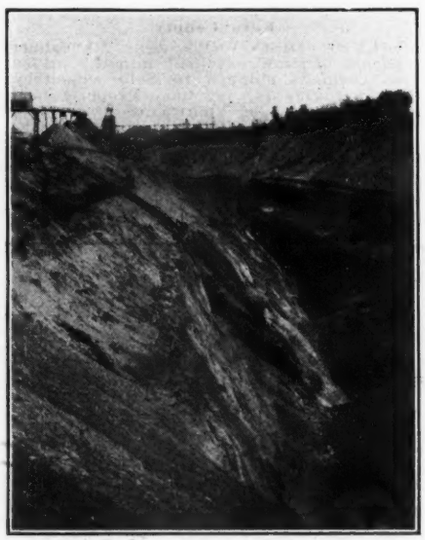
Beaverhead County

BOSTON & MONTANA DEVELOPMENT (Wise River)—Ground softening in upper Idanha crosscut being driven toward fissure. Big Hole bridge of Montana Southern Ry., a subsidiary, now being constructed near Wise River, to which point steel has been laid. Railway will afford outlet for company's Elkhorn ores. Estimated will reach mines within sixty days.

SHEEP CREEK (Wise River)—Three feet of ore opened at grass roots, and two carloads ready for shipment with completion of Montana Southern. Ore reported high in silver, ranging from $5,000 to $7,000 car lot. Several shallow shafts on property.

Cascade County

CASCADE SILVER (Neihart)—Narrow orebody reported uncovered below the 500 level. Vice-president H. L. Maury files answer to suit of Paul A. Gow, director, denying illegality of directors' meeting, at which Maury, who was present, was voted 150,000 shares for "services rendered" to distribute as he saw fit. Value of stock around $300,000. Mr. Gow contends compensation was unreasonable for whatever service could have been rendered, and asks court to order stock restored to treasury.



THOMPSON CUT, CROSBY, MINN., ON CUYUNA RANGE

Jefferson County

LEGAL TENDER (Clancy)—Power line under construction. Two more carloads of ore almost ready for shipment. Ore fissures narrow, but good grade.

LIVERPOOL (Clancy)—Old shaft being retimbered and power line constructed.

ANGELICA (Wickes)—Shipping lead-silver ore regularly to East Helena plant of American Smelting & Refining Co. Ore showing on lower levels continues good.

Lincoln County

LUKENS HAZEL (Libby)—Will build 200-ton concentrator and power plant. Surveying for two-mile pipe line from Granite Creek to proposed mill site. Will haul concentrates by auto truck nine miles to Libby. Contract let for timbers. Telephone line being built from Libby to mine.

Mineral County

TARBOX (Saltese)—Directors have decided to install 150-ton concentrator, to represent expenditure of $75,000. Orebody of good grade opened 15 ft. wide.

Powell County

CHAMPION (Deer Lodge)—Tunnel being driven to open property at depth. Mine is old-time producer.

EMERY (Deer Lodge) — Preparing to build electric power line to mill and to rework old waste dump.

MONARCH (Elliston)—Will start tunnel soon. Sawmill construction about completed. Air compressors installed.

Silver Bow County

ANACONDA (Butte) — Operations for July will show considerably less than 55 per cent of normal, as measured by metal output. Mooney protest demonstration serving to call large number of miners from work. Labor controversy over wages affecting working forces.

BUTTE & SUPERIOR (Butte) — Tonnage increased at Black Rock mill. Ore showing good in development work easterly in Four Johns' claim.

DAVIS-DALY (Butte)—Miners who left work to join Mooney strike have returned, and sinking of Colorado shaft resumed. Planning to resume capacity operations. Now working at less than 50 per cent of normal.

EAST BUTTE (Butte) — Pittsmont smeltery will soon resume at capacity. Company giving considerable attention to development of oil ground in Wyoming fields.

NEVADA

Lyon County

MASON VALLEY MINES (Thompson)—Diamond drilling and other prospecting below main tunnel level has recently demonstrated large tonnage of good ore in lowest workings.

NORTHERN LIGHT COPPER (Yerington)—Bond and lease taken by Mason Valley Mines Co. Shipping ore from development work. Deepest shaft down 250 ft., last 80 ft. in sulphides. Orebody 10 ft. wide at bottom. Trucking expense almost prohibitive.

Nye County

BELCHER DIVIDE (Divide)—E. J. Roberts has uncovered new ledge crossing both Belcher and Belcher Extension, apparently about 50 ft. wide, assaying from $8 to $29 per ton, a few samples running higher.

BROUGHER DIVIDE (Divide)—New vein cut on 505 level, 3 ft. wide. Drift on 177 level advanced 550 ft. Expect to reach junction of Divide Extension and Tonopah Divide vein within 100 ft.

DIVIDE EXTENSION (Divide) — Drifts on 45 level of Caldwell shaft still in high grade recently opened. Roy Hardy, consulting engineer, states ore in both hanging-wall and foot-wall drifts averages about $75 per ton. Shaft down 80 ft. and vein will be crosscut again when it reaches 100 ft. Crosscut on 425 level of old shaft that is being driven to pick up vein opened in Caldwell shaft has advanced 25 ft. Andrew Walz, consulting engineer for Sherwood Aldrich, recently examined property.

TONOPAH DIVIDE (Divide)—Main vein opened up in 580 level crosscut at expected distance of 125 ft. from shaft. Crosscut driven into vein 8 ft. without reaching foot wall, and drifting begun on hanging wall. No assay figures given out, management stating vein is in good commercial ore. Chief value in gold on fifth level, it is unofficially stated. Southeast drift on second level extended to get over "big bulge," where vein on third level attains 80-ft. width. Drift now out 325 ft., last 50 ft. averaging $150 per ton, according to management.

White Pine County

NEVADA CONSOLIDATED (McGill)—Copper production in June was 3,715,482 lb.; May, 3,700,000.

NEW MEXICO

Grant County

D. L. HILL, of Lordsburg, has purchased from Klein and Reynolds old silver property in Gold Hill district, twelve miles north. Work will be started soon.

CO-OPERATIVE (Lordsburg) — Mill foundation complete. E. Walters, superintendent; A. Tabor, mine boss.

HOMESTAKE (Lordsburg)—Taken over by E. M. Luckey from J. Arnett, and under examination by G. C. Pidgeon for John Gleason and James Parks. Ore carries gold, silver, copper and lead.

LUCKY STRIKE (Lordsburg) — Small force cleaning out old silver property. T. Lister, owner.

OCTO (Lordsburg)—Main shaft down 225 ft. Labor reported scarce. Working 25 men. E. K. Davis, superintendent.

RUTH (Lordsburg)—Under lease by W. T. Scarboro, who has car silver-lead ore ready to ship to El Paso smeltery.

CHINO COPPER (Santa Rita)—Copper production in June was 3,615,458 lb.; May, 3,583,396.

OKLAHOMA

Joplin-Miami District

WEST VIRGINIA (Miami) — Planning construction of new mill on lease two miles east of Quapaw, Okla. Now sinking second shaft.

U. S. ZINC SMELTING (Picher) — Again in charge of Manhattan mine after turning it over to John A. Skinner, of Webb City, a year ago. Mine producing more heavily of late.

VANTAGE (Picher)—H. P. Sharpe and associates have bought interest of J. H. Denny. Sharpe becomes manager, succeeding O. A. Sneed, one of original owners, who sold out about six months ago.

BIG V. (Quapaw)—Controlling interest bought by Paul V. Mackey, of Vinita, Okla. Changing from steam to gas power. Fred Parish, superintendent.

SOUTH DAKOTA

Custer County

AMERICAN MICA PRODUCTS (Custer)—Property near Oreville being worked and mica shipped to Custer, where it is trimmed and sorted for market.

NATIONAL MICA (Custer)—Mica mine near Oreville has resumed operation. Product shipped to Hot Springs, where it is being prepared for market.

Pennington County

NATIONAL TIN (Hill City)—Machinery for concentrator arrived and being installed. Cowboy shaft being enlarged to one of three compartments, after which it will be sunk to 500 ft. Mohawk undergoing thorough development.

GERARD (Keystone)—Ore of good grade cut by tunnel at depth of 400 ft. Option on property given to New York interest, which will thoroughly develop ground.

St. Lawrence County

HOMESTAKE (Lead)—Report for year ended Dec. 31, 1918, shows surplus, after deduction of charges and taxes, of $305,417, equal to $1.21 a share earned on $25,116,000 capital, against surplus of $1,195,383, or $4.75 a share, in previous year.

TEXAS

Coryell County

LARGE ACREAGE LEASED near Copperas Cove, west of Temple, by New York men, and drilling will be started at once. Stated fourteen carloads of machinery and pipe now on ground.

Crockett County

SPUDDING IN for deep well on Blake Mouldin Ranch, near Ozona, will be done at once. Ryan Petroleum Co., of New York, has built derrick on Roy Henderson Ranch. Equipment ordered from Oklahoma sufficient to sink this well to 4,000 ft. if necessary. E. B. Kirk, superintedent in charge. Drilling will be done on upper ranch of Robert Massie and on ranch of County Judge Charles E. Davidson, by Eddy, Ludlow & Thomas, of Stephenville, Tex., and Tulsa, Okla. This firm has made third location on ranch of John Carson, in Pecos County, and materials expected on ground early in July.

Jefferson County

GULF PRODUCTION (Beaumont)—McFadden No. 2 well, at Spindle Top extension field down 1,530 ft. in fifteen days' drilling. No. 1 McFadden well furnishes enough gas for fuel in drilling this well.

TEXAS CO. (Beaumont)—Will be drilling soon on Fee No. 1 and No. 2 wells.

Liberty County

BIG FOUR (Hull)—Came in as gusher and now making good production on pump. Well only 1,500 ft. deep, or 1,000 ft. less than near-by wells; oil 33 gravity, that from deeper wells being 22. Exhaustion of gas caused well to cease flowing, but no signs of sanding up indicated.

Orange County

WILD-CAT WELL being drilled on Fletcher farm, twelve miles north of Beaumont. Gas seepage known here for years.

UTAH

Juab County

BIG HILL (Eureka)—Property, recently taken under development by Knight interests, to be opened by shaft to depth of 1,000 ft. Old shaft on property, 200 ft. deep, to be enlarged and retimbered, when further sinking will be started.

CHIEF CONSOLIDATED (Eureka) — Surface work on unpatented claims in eastern and northern Tintic, arranged for under contract, practically completed.

COPPER LEAF (Eureka)—Shaft down 1,200 ft. Second fan installed to improve air.

EUREKA METALLURGICAL (Eureka)—Small experimental plant operated for some time to be electrified. Results of work reported satisfactory, and company stated to have funds for operation on larger scale.

LEHI TINTIC (Eureka)—Development of ore recently opened to be continued. Shaft to be sunk to 500 ft. and prospecting done, as indications point to more ore at depth.

TINTIC EASTERN (Eureka)—Company formed to operate group of nineteen claims adjoining Tintic Standard and Apex Standard. Officers: J. E. Myers, president; Andrew L. Hurley, vice-president; J. H. McChrystal, G. W. Morgan and G. A. Udall.

TINTIC STANDARD (Eureka)—Six-day shutdown over July 4 used in completing change to new equipment and to making repairs in main shaft. No. 2 shaft down 1,000 ft., and after cutting of station will be sunk to 1,500 level. Railroad to property expected to be completed by Sept. 1.

ZUMA (Eureka)—Ore opened on 500 level followed by winze almost to 800 level, where drifting has been started to cut ore, which has apparently dipped away from winze.

SHOWERS (Silver City)—Hoisting plant and all buildings destroyed by fire. Loss estimated at $12,000. Owned by Walker Bros., Salt Lake City. Worked under lease.

Salt Lake County

UNITED STATES (Bingham Canyon) — Fire that broke out in mine on June 27 continuing, and owing to presence of gas, not expected to be under control for several days. About 350 men out of employment until fire abates (July 8).

HOWELL (Salt Lake City) — Operations resumed.

UTAH COPPER (Salt Lake City)—Copper production for June was 9,528,000 lb.; May, 9,125,000.

Summit County

PARK CITY getting back to normal conditions after strike, and shipments again being made. During week ended July 5, there were shipped 1,586,060 lb. of ore and concentrates. Shippers were Ontario Silver, Naildriver, Silver King Coalition, Judge Mining & Smelting, and Daly West. Good miners still scarce in this camp.

Utah County

SOUTH PARK (American Fork)—Contract let for raising and sinking on fissure cut by tunnel at 600-ft. point. Emma beddings expected 150 ft. above tunnel and Cardiff limestone below it. Ore expected to be found making off from fissure into beddings.

WASHINGTON

Ferry County

VIRGINIA (Danville) — Directors visit property and decide to resume operations in August.

Stevens County

NORTHWEST MAGNESITE (Chewelah)—Has resumed operations with one kiln, to fill order for several hundred tons to go to Eastern concern which needs product to tide over until shipments can be received from Austria.

UNITED COPPER (Chewelah) — Oscar Lachmund made general manager. Conrad Wolfle, former manager, retains presidency and will develop property he owns in Nevada.

LOON LAKE COPPER (Loon Lake)—Company sues George T. Crane for $131,250 and George Turner for $31,250, alleging that while in control Crane secured treasury stock worth 70c. at 11⅞c. a share, and that Turner secured 40,000 shares of stock worth $35,000 for $3,750.

NORTHPORT S. & R. (Northport)—Has begun suit for $100,000 against Lone Pine-Surprise Co., at Republic, Wash., for value of ores alleged to have been removed from Northport company's property at Republic; also similar suit against Insurgent Gold Mining Co. for same amount.

WISCONSIN

Zinc-Lead District

FRONTIER MINING (Galena) — Company one of most successful independent operators in Wisconsin field. Is operating Bear Cat and Middle mines, at Benton, and resuming operations at Bull Moose, on Grotkin lease. Drilling in progress on Jeffries and John Gray leases, at Hazel Green.

MINERAL POINT ZINC (Galena) — Mines of company now in operation are Penna Benton and Hoskins, at New Diggings. Coker No. 1, at Livingston, and Black Jack, at Galena. In addition company continues cleaning out old mine shafts at Highland and shipping crude carbonate, without milling, to oxide plant, at Mineral Point. Additional orebodies blocked out by drill at Coker and Hoskins properties.

VINEGAR HILL ZINC (Platteville)—Operating its Jefferson, Graham, and North Unity mines, and reopening Yewdall mine, at Livingston. Is sinking new shaft and drilling on Copeland lease, at Shullsburg.

WISCONSIN ZINC (Platteville)—Operating Champion, C. A. T., and Longhorn mines, all at New Diggings, and drilling Booty lease, west of abandoned Winshell, where results of drilling so far obtained indicate proximity of another orebody.

CANADA

British Columbia

CORK PROVINCE (Kaslo)—Operating mill one shift.

GIBSON (Kaslo)—Supreme Court decision at Vancouver, B. C., gives controlling interest to J. M. Wolbert and Louis Chassy, both of Spokane, instead of D. K. May, also of Spokane.

SILVER BEAR (Kaslo)—R. F. Green and Clive Pringle pay $10,000 and take $100,000 option on property near Kaslo, formerly owned by Frank Helme, of Nelson. New owners will develop it along with Silver Bell group.

SILVER BELL (Kaslo)—Owners have acquired adjoining Silver Bear group, and will consolidate.

NELSON M. & D. (Nelson)—W. W. Shaffner, manager, reports company will develop Whitewater and Comstock groups on Cascade Creek in Lardo district. One crew driving tunnel to reach orebody.

PREMIER (Portland Canal District)—Building assay office and accommodations for large force. Portable sawmill at work and road being repaired for heavy hauling.

OHIO (Retallick)—Dr. F. C. Descent and other Spokane men have taken bond on Ohio mine, near Kaslo, for $10,000, and expect to equip property.

BLUE BELL (Riondel)—Unwatering in progress. Low-grade lead carbonate ore shipped last year was important part of Ainsworth division's production. Shipments discontinued on signing of armistice.

SILVERSMITH (Sandon)—J. B. White, president, reports 3-ft. orebody cut in drift on 8th level. In drifting for this tunnel passed through orebody 50-60 ft. long and 4-16 in. wide, in which clean ore contained 136 oz. of silver per ton and 70 per cent lead. Mine production in June about 300 tons of concentrates.

Ontario

KENNEDY-BOSTON (Boston Creek)—Vein 14 in. wide partly stripped and some ore extracted.

MILLER INDEPENDENCE (Boston Creek)—Men who went out on strike have returned under practically old conditions.

PATRICIA SYNDICATE (Boston Creek)—Destruction of mill by fire has caused loss estimated at $75,000; insured for about $30,000.

QUEEN OF SHEBA (West Shining Tree)—Most camp buildings destroyed by forest fires.

BAILEY (Cobalt) — Justice Sutherland has upheld Master-in-Ordinary in refusal to allow sale of property to A. J. Young, of Northern Customs Concentrators, Ltd., with which it was proposed to amalgamate Bailey.

CROWN RESERVE (Cobalt) — Will develop claims located in Larder Lake district.

DOME (Porcupine)—Stated that company will issue monthly reports.

McINTYRE (Porcupine) — Cutting station at 1,200 level of shaft, and will continue shaft to 1,375 ft., which will be main haulage level and will be equipped with electric locomotives.

VIPOND (Porcupine) — Directors have decided to keep property closed down until labor difficulties are finally settled.

MEXICO

Sonora

GREENE CANANEA (La Cananea)—Production in June was 3,000,000 lb. copper; 147,790 oz. silver; 700 oz. gold. Production of copper unchanged from April and May.

KOREA

ORIENTAL CONSOLIDATED (Unsan)—June clean-up, $84,830; May, $90,530. Heavy rainfall between May 4 and May 10 increased flow into mines so that Chorrie hydro-electric plant could not furnish enough power for pumps. Taracol mill therefore shut down to drive Taracol auxiliary electric plant by mill steam engine. Tonnage thus reduced. Four weeks' time also lost on Suribong power project owing to rains. Completion of dam expected by July 20. Taracol and Tabowie mills will be closed part of rainy season, owing to need of power for pumping. Labor and political situation unchanged.

THE MARKET REPORT

Daily and Weekly Metal and Mineral Prices, Metal Market Conditions, Average Monthly Prices, Stock Quotations

Silver and Sterling Exchange

July	Sterling Exchange	Silver: New York, Cents	Silver: London, Pence	July	Sterling Exchange	Silver: New York, Cents	Silver: London, Pence
10	449	106⅜	53⅛	14	446½	106½	53⅝
11	449	106⅜	53¼	15	442	106	53⅛
12	447⅞	106⅛	53¼	16	434	104½	54⅛

New York quotations are as reported by Handy & Harman and are in cents per troy ounce of bar silver 999 fine. London quotations are in pence per troy ounce of sterling silver, 925 fine.

Daily Prices of Metals in New York

July	Copper: Electrolytic	Tin: Spot	Lead: N. Y.	Lead: St. L.	Zinc: St. L.
10	19.85@20.10	68	5.40	5.17½@5.20	7⅛@7¼
11	20.25@20.75	68	5.40@5.45	5.17½@5.20	7.30 @7.40
12	20.75	68	5.40@5.45	5.20	7.40 @7.50
14	20.80@21.00	68	5.50	5.27½@5.30	7.45 @7.55
15	21.30@21.90	68	5.50@5.52½	5.27½@5.30	7.55 @7.60
16	21.90	68	5.50@5.55	5.30	7.62½@7.67½

The above quotations are our appraisal of the average of the major markets based generally on sales as made and reported by producers and agencies, and represent to the best of our judgment the prevailing values of the metals for the deliveries constituting the major markets, reduced to basis of New York, cash, except where St. Louis is the normal basing point.

Quotations for copper are for ordinary forms of wire bars, ingot bars and cakes. For ingots an extra of 0.05c. per lb. is charged and there are other extras for other special shapes Cathodes are sold at a discount of 0.125c. per lb.

Quotations for spelter are for ordinary Prime Western brands. We quote New York price at 35c. per 100 lb. above St. Louis. Tin is quoted on the basis of American tin, 99 per cent grade.

London

July	Copper: Standard Spot	Copper: Standard 3 M.	Copper: Electrolytic	Tin: Spot	Tin: 3 M.	Lead: Spot	Lead: 3 M.	Zinc: Spot	Zinc: 3 M
10	96	97	100	250½	249	23⅝	23⅞	41¾	42
11	94¾	95¾	99	246¼	245¾	23¾	24⅜	41½	42¼
12	...	...	...	...	...	...	...	...	...
14	97¾	98½	100	246	245½	23¾	24⅜	41¾	42¾
15	100¾	101½	103	250¼	249¾	23⅝	24¼	42½	43¾
16	105	105¾	106	254½	254¼	23⅞	24½	43¾	44¾

The above table gives the closing quotations on London Metal Exchange. All prices are in pounds sterling per ton of 2240 lb.

Metal Markets

New York—July 16, 1919

This was a week of furious activity in the major non-ferrous metals, with the exception of tin. Copper, lead, and zinc all experienced noteworthy advances in price, especially copper.

The rise in copper has been favorably received in Great Britain, where it has afforded an opportunity for some reduction in the government's stock of copper, but the statistics of July 1 showed that the latter still amounted to about 100,000,000 pounds.

With the present sentiment, both here and in England and France, large unsold stocks of the metals have ceased to be a factor of immediate importance. Whether this is a case of familiarity breeding contempt, or the reflection of the prevalent opinion that present metal values are relatively low, may be left to individual opinion.

The stocks of metals in the hands of the British Ministry of Munitions July 1, with the corresponding figures for June 1 in parentheses, were as follows: Copper, 99,227,520 lb. (107,502,080); lead, 271,342,400 (268,591,680); zinc, 88,289,600 (86,078,720); aluminum, 23,874,080 (24,458,560); nickel, 5,492,480 (7,956,480); antimony, 9,784,320 (10,080,000).

The further decline in sterling exchange, which this week fell to the lowest point heretofore recorded, is necessarily reflected in the London quotations for commodities. It has a disastrous effect upon contracts entered into previously that are now being executed. For the first time since the beginning of the war there were transactions in German exchange this week, the quotation of the mark being about 8c.

Freights to Hongkong and Kobe from San Francisco are unchanged at $14 per ton. In transatlantic freights the rate from New York to British ports is 0.9c. per lb.; to French ports quotations are irregular, but appear to be higher.

Copper

At the close of our last week copper stood at 20c. per lb., delivered, or 19.85c., f.o.b. New York. Some sellers thought that the advance was ended, and on the following day sold liberally at unchanged prices, but buyers simply took the bit in their teeth and ran away with the market. On Thursday and each succeeding day there was an enormous demand, which was in nowise checked by the sharp advances in price that were made from day to day by the producers. The characteristics of a sellers' market, which have now obtained for about three months, were more in evidence than ever, and producers could easily refuse to sell to undesirable customers. Thus there was a general refusal among the principal offices to sell for speculative accounts.

Japan was again a large buyer, both through the Export Association and outside of it, and the Japanese demand was largely responsible for the advances in the market. Among domestic consumers wire-drawers continued to be the principal buyers, but there was substantial business with brass-makers. The aggregate business was large and exceeded the total of the previous week.

The London quotations of £115 for futures and £106 for spot correspond with 22½c. and 20.70c., respectively, c.i.f., with exchange at 4.39.

Germany made at least one direct inquiry for copper this week, and there were other inquiries which were assumed to be indirectly for German account.

The labor situation at Butte remains substantially unchanged. It has become a play between the I. W. W. and the American Federation of Labor, i. e., between the radical and conservative parties. In the meanwhile a great unrest continues.

There was riot this week at Rome, N. Y., where the strike is still in effect. At Hastings-on-the-Hudson some of the men have returned to work.

Copper Sheets—The base price of copper sheets is 31½c. per lb. Demand strong. Copper wire is quoted at 25½c. in carload lots, f.o.b. mill. Market strong. Heavy buying during last two months. Most mills reported loaded with orders up to Oct. 1.

Tin

The market is mainly in the hands of the American smelters, but brokers are able to do some business in resale lots

and in futures. However, the largest consumers of tin are finding that their business is becoming very good, and, consequently, they are not disposed to sell such surplus stocks as they may have. High-grade tin—electrolytic, Lamb & Flagg and Straits—was quoted at 70c. right through the week. Straits tin for July shipment declined as low as 51c., but rallied and today was quoted at 52c.

Lead

There was a tremendous speculative demand for this metal, which combined with very substantial demand from consumers, enabled those producers who still had stocks to relieve themselves materially, and, indeed, enabled them to realize advances over the price of the A. S. & R. Co. Consequently, the A. S. & R. Co. was led to advance its price to 5.50c. on July 14, but the demand continuing strong, higher prices were realized by outside sellers. Lead for future delivery commands a premium over prompt. Chemical lead continues in strong demand and commands a premium.

Among domestic consumers, corroders were the principal buyers this week.

British advices report that the consumption of lead in Great Britain is increasing. The corroders are unable to keep up with the demand. However, the sheet and pipe trades are lagging. This is simply a repetition of the experience of America.

Zinc

Very large business was done during the week at steadily advancing prices. Some producers who had been holding their stocks of spelter for a long time became free sellers on the advance, but their offerings were readily absorbed. Galvanizers were important buyers. There were large purchases for speculative account. High-grade zinc is quoted at 8¼@8½c.

Belgian zinc smelters are steadily getting into working order.

Zinc Sheets—The quoted price of zinc sheets is $10 per 100 pounds.

Other Metals

Aluminum—Virgin metal quoted at 33c. per lb. Market quiet.

Antimony—Reports respecting this market were rather conflicting, but, on the whole, we characterize it as having been a little stronger, and quote spot at 8½@8¾c. The Chinese producers have been selling large quantities of antimony to Denmark and Norway, the final destination of which is supposed to be Germany.

Bismuth—Metal of the highest purity for pharmaceutical use is quoted at $3.10 per lb. for wholesale lots—500 lb. and over. No change.

Cadmium—Quoted at $1.50 per lb. in lots of 500 pounds. For lots under 200 pounds, $1.75 per lb. No change.

Nickel—Ingot, 40c.; shot, 43c.; electrolytic, 45c. per pound.

Quicksilver—The rise to $107, at which the market closed last week, was only maintained a few days, after which the price declined to $103, and the market became rather quiet.

Silver and Platinum

Silver—The feature of the last week has been the weakness in the sterling exchange market. Offerings have been so much in excess of the demand that the demand rate has dropped from $4.49 on July 10 to $4.34 on July 16. This fall in exchange has seriously affected the price of silver and more than offset the advance of ¾d. per ounce in London bid price. Silver has ruled around $1.06¼ for London shipment, but China banks have paid a premium over London price and bought considerable amounts.

Mexican dollars at New York: July 10, 81¾; July 11, 82; July 12, 81¼; July 14, 82⅜; July 15, 82; July 16, 80¾.

Platinum—In very strong demand. We quote $105@$110 for refined ingot.

Palladium—Quiet at $120.

Zinc and Lead Ore Markets

Joplin, Mo., July 12—Zinc blende, per ton, high, $52.75; basis 60 per cent zinc, premium, $50; Prime Western, $47.50@$50; sludge and flotation, $47.50@$45; calamine, basis 40 per cent zinc, $30@$25. Average settling prices, blende, $44.07; calamine, $30.29; all grades of zinc, $43.71.

Lead, high, $66.55; basis 80 per cent lead, $63@$60; average settling price, all grades of lead, $63.49 per ton.

Shipments the week: Blende, 6,371; calamine, 171; lead, 1,036 tons. Value, all ores the week, $351,690.

While most buyers were finessing along Friday morning waiting for sellers to accept a $45 basis, one buyer picked up 1,500 tons on $47.50 basis. Then the price went to $50 basis. Buyers of ore for sheet-zinc factories noted the trend early and made their purchases on $50 basis. Except for the 1,500-ton lot, blende prices generally advanced $5 per ton. The production this week is 40 per cent below the average of the first six months.

Platteville, Wis., July 12—Blende, basis 60 per cent zinc, $50 base for premium grade and $47.50 for high lead or Prime Western grade. Lead ore, basis 80 per cent lead, $60 per ton. Shipments reported for the week are 1,586 tons blende, 195 tons galena, and 197 tons sulphur ore. For the year to date the totals are 53,757 tons blende, 3,039 tons galena, and 7,573 tons sulphur ore. During the week 2,842 tons blende was shipped to separating plants. The upward trend in the zinc-ore market has already caused the reopening of several mines, and others will follow.

Other Ores

Chrome Ore—Business was reported at $25 per ton, f.o.b. California point, for ore running 40 per cent and better.

Manganese Ore—South American ore is offered at 65c. per unit, Baltimore. Buyers are not disposed above 55c.

Molybdenum Ore—Quoted nominally at 75@80c. per lb.

Tungsten Ore—Some business in Chinese and Japanese ore was reported at $7@$7.50. Some sales of scheelite were reported at $10.

Other Minerals

Graphite—The situation is practically unchanged, with the exception that marine freight rates from Ceylon to New York have advanced about £1 per ton for August shipment over the July rate. Another slight advance will be recorded for September and October shipments. Only very small quantities are being imported, as there is little demand in the market. Prices remain practically stationary, the following being quoted for Ceylon trade: Lump, 13¾c@14¼c.; chip, 10¼@11c.; dust, about 7¼@8c. All prices are c.i.f. New York, ex ship. The market for domestic grade is dull.

Nitrate—Conditions are reported unchanged. The Government continues to liquidate its stocks, and the end of the Government accumulation is said to be in sight. Imported material is being delivered in small quantities, but a revival of regular shipments is expected. Prices are generally quoted at $3.25 per cwt., carload lots, for immediate shipment, but one large firm has named $2.95.

Pyrites—Spanish pyrites is quoted at 18c. per unit for furnace ore, c.i.f., New York or other Atlantic port, and 18¼c. at Gulf ports. Market slow and unsettled; hand-to-mouth buying. Price will decrease with ocean freights.

Iron Trade Review

Pittsburgh—July 15

The American Iron and Steel Institute reports that steel-ingot production in June, by thirty companies which in 1918 made 84.03 per cent of the total output, amounted to 2,219,219 gross tons. From this the annual rate in June by the entire industry may be computed at 32,850,000 tons a year, or 67 per cent of capacity, taking the latter at 49,000,000 tons a year. The 67 per cent for June compares with the following for preceding months: January, 87; February, 85; March, 77; April, 65; May, 54. Production probably dropped to about 50 per cent at the middle of May, and, as production was increasing during June, the rate at the close of the month was probably about 70 per cent, showing a remarkable recovery, from 50 to 70 per cent in a month and a half. Production has not increased materially since the first of July. The increase in production previously recorded reflects the increase in the buying of steel products which began about the second week of May.

Contracting for steel products is now on a fairly large scale, the buying up to the latter part of May having been simply by placing actual shipping orders. Contracts made generally run to the end of the year. It is claimed some automobile makers have contracts for bars and perhaps other products to

July 1, 1920. The sheet mills have refused to contract for automobile sheets beyond this year, proposing that contracts for the first half of next year be at a $5 advance, to which the automobile makers demur. The fact that contracting has been in vogue since about the first of June is reflected by the Steel Corporation's statement of unfilled obligations, which showed an increase of 610,545 tons during June, against a decrease of 518,375 tons in May and decreases averaging 640,000 tons a month in the six months December to May inclusive.

The finished-steel market may be a trifle quieter in a few lines, but in sheets, tin plate, and pipe, at any rate, the bookings thus far this month are well in excess of the average rate in June. Pipe bookings are running about double the capacity and sheets bookings from 50 to 75 per cent in excess of capacity. Tin-plate demand has had a great spurt in the last few weeks, due largely to additional demand for the California fruit and vegetable packs. All tin plate for California use must leave mills by about Aug. 10. There is increased demand for tin plate for the salmon pack; also better export demand, exports in May having been 14,000 tons.

There is a fair movement in the pig-iron market, though tonnages are not as large as in June. Price irregularities have practically disappeared, these having been due largely to furnaces in other districts endeavoring to sell in the local market. The Valley furnaces are all firm and are comfortably sold up.

There is a heavy demand for sheet bars, but little tonnage passes through the open market, mills simply ordering their supplies from regular sources, as these sources prove adequate and there is no chance of securing price concessions. The Steel Corporation is experiencing some difficulty in supplying its sheet and tin-plate subsidiary with sheet bars, and is putting its Columbus works in operation to improve the supply. Billets and slabs are in light demand. We quote: Billets, $38.50; sheet bars and small billets, $42; slabs, $41; rods, $52.

Quoting prices on 80 per cent ferromanganese have now settled down to $115, furnace, for domestic, and $115, c.i.f., for English, with prospects that inquiry would develop special prices. Spiegeleisen presents no regular market, being quotable nominally at about $30@$33 for 18 per cent, delivered.

The market for Connellsville furnace coke for spot or prompt shipment has reverted to $4, where it stood before the market was forced up to $4.25 by buying intended to provide against shortages due to Independence Day and other celebrations. So many ovens have been blown in lately that a surplus may develop. Foundry coke easily retains its recent advance. We quote: Spot furnace, $4; spot foundry, $4.75@$5.25; contract foundry, second half, $5@$5.50, per net ton at ovens.

MONTHLY AVERAGE PRICES OF METALS

Silver

	New York			London		
	1917	1918	1919	1917	1918	1919
Jan.	75.630	88.702	101.125	36.682	44.356	48.438
Feb.	77.585	85.716	101.125	37.742	42.792	48.027
Mar.	73.861	88.082	101.125	36.410	43.620	48.171
April	73.875	95.346	101.125	36.963	47.215	48.886
May	74.745	99.505	107.135	37.940	48.980	52.104
June	76.971	99.500	110.430	39.065	48.875	53.896
July	79.010	99.625	.....	40.110	48.813	.....
Aug.	85.407	100.292	.....	43.418	49.077	.....
Sept.	100.740	101.125	.....	50.920	49.500	.....
Oct.	87.332	101.125	.....	44.324	49.500	.....
Nov.	85.891	101.125	.....	43.584	48.969	.....
Dec.	85.960	101.125	.....	43.052	48.492	.....
Year	81.417	96.772	.....	40.851	47.516	.....

New York quotations cents per ounce troy, 999 fine; London, pence per ounce, sterling silver, 925 fine.

Copper

	New York		London			
	Electrolytic		Standard		Electrolytic	
	1918	1919	1918	1919	1918	1919
Jan.	23.500	(a)	110.000	92.238	125.000	106.619
Feb.	23.500	16.763	110.000	78.700	125.000	95.700
Mar.	23.500	14.856	110.000	76.821	125.000	82.071
April	23.500	15.246	110.000	77.300	125.000	82.200
May	23.500	15.864	110.000	77.767	125.000	81.227
June	23.500	17.610	110.000	83.062	125.000	85.900
July	25.904	.....	119.913	.....	134.913	.....
Aug.	26.000	.....	122.000	.....	137.000	.....
Sept.	26.000	.....	122.000	.....	137.000	.....
Oct.	26.000	.....	122.000	.....	137.000	.....
Nov.	26.000	.....	122.000	.....	137.000	.....
Dec.	(a)	.....	118.447	.....	133.167	.....
Year	24.628	.....	115.530	.....	130.507	.....

(a) No Market.

Tin

	New York		London	
	1918	1919	1918	1919
January	85.500	67.702	293.227	248.557
February	92.000	66.801	311.525	223.963
March	(a)	67.934	318.875	236.843
April	(a)	72.500	329.905	225.275
May	(a)	72.500	364.217	234.398
June	(a)	71.240	331.925	238.263
July	(a)	.....	360.347	.....
August	(a)	.....	380.900	.....
September	(a)	.....	343.905	.....
October	(a)	.....	335.543	.....
November	(a)	.....	323.550	.....
December	(a)	.....	267.736	.....
Av. year	88.750	.....	330.138	.....

(a) No average computed.

Lead

	New York		St. Louis		London	
	1918	1919	1918	1919	1918	1919
January	6.782	5.432	6.684	5.316	29.00	37.227
February	6.973	5.057	6.899	4.784	29.00	28.675
March	7.201	5.226	7.091	4.992	29.00	27.952
April	6.772	4.982	6.701	4.722	29.00	24.888
May	6.818	5.018	6.704	4.773	29.00	23.852
June	7.611	5.340	7.511	5.070	29.00	22.544
July	8.033	.....	7.750	.....	29.00	.....
August	8.050	.....	7.750	.....	29.00	.....
September	8.050	.....	7.750	.....	29.00	.....
October	8.050	.....	7.750	.....	29.00	.....
November	8.050	.....	7.750	.....	31.20	.....
December	6.564	.....	6.324	.....	40.00	.....
Year	7.413	.....	7.222	.....	30.10	.....

Zinc

	New York		St. Louis		London	
	1918	1919	1918	1919	1918	1919
January	7.836	7.272	7.661	7.922	54.000	56.045
February	7.814	6.623	7.639	6.273	54.000	46.150
March	7.461	6.500	7.286	6.150	54.000	38.500
April	6.890	6.465	6.715	6.114	54.000	36.118
May	7.314	6.429	7.114	6.079	54.000	35.477
June	8.021	6.901	7.791	6.551	54.000	36.763
July	8.688	.....	8.338	.....	54.000	.....
August	8.985	.....	8.635	.....	54.000	.....
September	9.442	.....	9.092	.....	54.000	.....
October	8.801	.....	8.451	.....	54.000	.....
November	8.491	.....	8.141	.....	54.100	.....
December	8.163	.....	7.813	.....	56.050	.....
Year	8.159	.....	7.890	.....	54.180	.....

New York and St. Louis quotations, cents per pound London, pounds sterling per long ton.

Pig Iron, Pittsburgh

	Bessemer‡		Basic‡		No. 2 Foundry	
	1918	1919	1918	1919	1918	1919
January	$37.25	$33.60	$33.95	$31.40	$33.95	$32.40
February	37.25	33.60	33.95	31.40	33.95	32.40
March	37.25	32.50	33.95	31.40	33.95	29.12
April	36.15	29.35	32.95	27.15	33.95	28.15
May	36.20	29.35	33.00	27.15	34.00	28.15
June	36.36	29.35	33.16	27.15	34.16	28.15
July	36.60	.....	33.40	.....	34.40	.....
August	36.60	.....	33.40	.....	34.40	.....
September	36.60	.....	33.40	.....	34.40	.....
October	36.60	.....	34.40	.....	35.40	.....
November	36.60	.....	34.40	.....	35.40	.....
December	36.60	.....	34.40	.....	35.40	.....
Year	$36.67	$39.62	$33.70	$40.83	$34.45	.....

‡ As reported by W. P. Snyder & Co.

STOCK QUOTATIONS

N. Y. Exch.†	July 15
Alaska Gold M	3⅛
Alaska Juneau	2⅛
Am.Sm.&Ref.,com.	87⅛
Am.Sm. & Ref.,pf	108
Am.Sm.Sec., pf., A.	94⅛
Am. Zinc	27⅛
Am. Zinc, pf	63⅛
Anaconda	76⅛
Batopilas Min	1⅛
Bethlehem Steel	107⅛
Butte & Superior	35⅛
Butte Cop. & Zinc	13⅛
Cerro de Pasco	64⅛
Chile Cop	28⅛
Chino	50
Colo. Fuel & Iron	54
Crucible Steel	142⅛
Crucible Steel, pf	‡105
Dome Mines	14
Federal M. & S.	21⅛
Federal M. & S., pf.	46⅛
Great Nor., ore ctf.	50⅛
Greene Cananea	46⅛
Gulf States Steel	76⅛
Homestake	84⅛
Inspiration Con	67⅛
International Nickel	32⅛
Kennecott	42⅛
Lackawanna Steel	91⅞
Mexican Petrol	193⅛
Miami Copper	31
Nat'l Lead, com	85⅛
National Lead, pf	111
Nev. Consol	21
Ontario Min	8⅛
Ray Con	26⅛
Republic I.&S.,com.	102⅛
Republic I.&S., pf.	104⅛
St. Joseph Lead	15⅛
Sloss-Sheffield	74⅛
Tennessee C. & C.	16⅛
U. S. Steel, com	113⅛
U. S. Steel, pf	116⅛
Utah Copper	95⅛
Va. Iron C. & C.	66
Worthington Pump	85⅛

Boston Curb *	July 15
Boston Ely	⅛
Boston & Mont	.91
Butte & Lon'n Dev	.18
Calaveras	1⅛
Chief Con	3⅛
Contact	‡.05
Cortez	.12
Crown Reserve	.30
Crystal Cop	.10
Crystal Cop. (new)	.54
Eagle & Blue Bell	2⅛
First Nat. Cop	⅛
Gadsden Cop	3⅛
Houghton Copper	1
Intermountain	‡.05
Iron Blossom	.25
Iron Cap	.12
Majestic	.27
Mexican Metals	.16
Mojave Tungsten	.14
Nat. Zinc & Lead	.09
Nevada-Douglas	.24
New Baltic	⅛
Oneco	.75
Pacific Mines	‡.35
Rex Cons	.09
Yukon Gold	.85

San Fran.*	July 15
Alta	‡.08
Andes	.19
Best & Belcher	.16
Caledonia	.14
Challenge Con	‡.03
Confidence	‡.25
Con. Virginia	1.85
Gould & Curry	.08
Hale & Norcross	.16
Jacket-Cr. Pt	.16
Mexican	.39
Occidental	‡.40
Ophir	1.00
Overman	‡.10
Savage	.10
Sierra Nevada	.06
Union Con	.14
Utah Con	.03
Belmont	3.50
Jim Butler	.32
MacNamara	.80
Midway	.31
Mont.-Tonopah	.15
North Star	.09
Rescue Eula	.19
West End Con	1.75

Colo. Springs *	July 15
Atlanta	.03
Booth	.07
Comb. Frac	.04
Florence	.68
Jumbo Extension	.10
Kewanas	.03
Nevada Hills	.04
Nevada Packard	.28
Round Mountain	.37
Silver Pick	.06
White Caps	.14

Cresson Con	3.37½
Doctor Jack Pot	.03
Elkton Con	.04
El Paso	.15
Gold Sovereign	‡.02
Golden Cycle	1.66
Granite	.10
Isabella	.04½
Mary McKinney	.07
Portland	.94
United Gold M	.16½
Vindicator	.35

Boston Exch.†	July 15
Adventure	‡1½
Ahmeek	87
Algomah	.65
Allouez	46
Ariz. Com	15½
Arnold	‡.20
Bingham Mines	19½
Bonanza	‡.20
Butte-Balaklava	.40
Calumet & Ariz	79½
Calumet & Hecla	455
Carson Hill	18
Centennial	‡16
Copper Range	55
Daly West	‡2½
Davis-Daly	10½
East Butte	17½
Franklin	5
Granby	73½
Hancock	7
Hedley	‡12
Helvetia	6
Indiana	‡.1
Isle Royale	38
Keweenaw	1⅛
Lake	5½
La Salle	⅞
Mason Valley	4
Mass	8½
Mayflower	10½
Michigan	6½
Mohawk	75
New Arcadian	4
New Cornelia	25½
New Idria	9
Nipissing	10½
North Butte	14⅛
North Lake	1
Ojibway	3⅛
Old Dominion	45
Osceola	60
Quincy	75
St. Mary's M. L.	62
Santa Fe	‡.35
Seneca	24½
Shannon	3½
Shattuck-Ariz	‡15½
So. Lake	2⅛
So. Utah	‡.23
Superior	‡8
Superior & Bost	2⅛
Trinity	4
Tuolumne	1½
U. S. Smelting	69⅛
U. S. Smelting, pf	50
Utah Apex	‡3
Utah Con	11⅛
Utah Metal	3⅛
Victoria	‡3½
Winona	1⅛
Wolverine	25

N. Y. Curb.†	July 15
Alaska B. C. Met	1⅛
Alaska Mines	.75
Big Ledge	⅛
Butte & N. Y.	⅛
Butte Detroit	‡.03
Caledonia	.41
Calumet & Jerome	‡⅛
Can. Cop. Corpn	2
Cashboy	.08
Con. Ariz. Sm	1⅛
Con. Coppermines	⅛
El Salvador	‡3⅛
Goldfield Con	.17
Goldfield Merger	‡.04
Hecla Min	5½
Howe Sound	‡4½
Louisiana	‡1
Magma	48
Marsh	.09
McKinley-Dar-Sa	.65
Milford	‡.75
Morther Lode	‡.43
Nixon Nevada	.28
Ohio Cop	⅛
Rawley	‡2½
Ray Hercules	3⅛
Richmond	‡.50
Rochester Mines	‡.19
So. Am. G. & P.	11
Standard S. L.	⅛
Stewart	.26
Success	‡.04
Tonopah	‡3
Tonopah Divide	7⅛
Tonopah Ex	2⅛
Tribullion	‡.25
Troy Arizona	‡.10
United Eastern	4½
United Verde Ext	‡40
United Zinc	‡.25
Utica Mines	‡.08

Toronto *	July 15
Adanac	.13
Bailey	.03
Beaver Con	.38
Coniagas	2.50
Hargraves	.02
Kerr Lake	5.00
La Rose	.37½
Lake Shore	.87½
Min. Corp. of Can	1.50
Peterson Lake	.11
Teck-Hughes	.17
Temiskaming	.35
Trethewey	.35
Wettlaufer-Lor	.03
Davidson	‡.68
Dome Exten	.30
Dome Lake	.18
Hollinger	6.50
McIntyre	1.62½
Newray	.12½
Porcu. Crown	.27
Vipond	.18
West Dome	.12

* Bid prices. † Closing prices. ‡ Last quotations.

Current Prices—Materials and Supplies

IRON AND STEEL

SHEETS—Quotations are in cents per pound in various cities from warehouse also the base quotations from mill:

Blue Annealed	Large Mill Lots Pittsburgh	St. Louis	Chicago	San Francisco	New York Current	New York One Yr. Ago
No. 10	3.55	4.64	4.57	5.80	4.57	5.50
No. 12	3.60	4.69	4.62	5.75	4.62	5.55
No. 14	3.65	4.74	4.67	5.90	4.67	5.60
Black						
Nos. 18 and 20	4.15	5.24	5.17	6.75	5.17	6.30
Nos. 22 and 24	4.20	5.29	5.22	6.80	5.22	6.35
No. 26	4.25	5.34	5.27	6.95	5.27	6.40
No. 28	4.35	5.44	5.37	7.05	5.37	6.50
Galvanized:						
No. 10	4.70	5.79	5.72	....	5.50	6.85
No. 12	4.80	5.89	5.82	7.30	5.55	6.95
No. 14	4.80	5.89	5.82	7.30	5.60	6.95
Nos. 18 and 20	5.10	6.19	6.12	7.60	5.90	7.25
Nos. 22 and 24	5.25	6.34	6.25	7.75	5.05	7.30
No. 26	5.40	6.49	6.42	7.90	5.20	7.45
No. 28	5.70	6.79	6.72	8.20	5.50	7.75

STEEL RAILS—The following quotations are per gross ton *i.o.b.* Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard bessemer rails	$45.00	$65.00	$45.00	$65.00
Standard openhearth rails	47.00	67.00	47.00	67.00
Light rails, 8 to 10 lb.	2.58½*	3.36*	2.83½*	3.36½*
Light rails, 12 to 14 lb.	2.54*	3.09*	2.79*	3.09*
Light rails, 25 to 45 lb.	2.45*	3.00*	2.70*	3.00*

* Per 100 lb.

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago	St. Louis	San Francisco
Standard rai road spikes, ⅝-in. and larger	$3.35	$3.90	$4.27	$4.44	$5.65
Track bolts	4.35	4.90	5.17	Premium	6 65
Standard section angle bars	3.00	3.25	4.22	Premium	4.60

STRUCTURAL MATERIAL—The following are the base prices f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York 1 Yr. Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2.45	$3.47	$4.245	$3.54	$3.47
Channels, 3 to 15 in.	2.45	3.47	4.245	3.54	3.47
Angles, 3 to 6 in., ¼ in. thick	2.45	3.47	4.245	3.54	3.47
Tees, 3 in. and larger	2.45	3.52	4.245	3.54	3.47
Plates	2.66	3.67	4.495	3.54	3.67

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
$2.55	$2.55	$4–5

RIVETS—The following quotations are per 100 lb.:

	STRUCTURAL Mill Pittsburgh	Warehouse New York Current	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
½-in. and larger	$4.20	$4.72	$6.14½	$4.72	$4.79	$6.05	$5.90
CONE HEAD BOILER							
½ in. and larger	4.30	4.82	6.24½	4.82	4.89	6.15	6.00
⅝ and ¾	4.45	4.97	6.39½	4.97	5.04	6.30	6.15
⅞ and 1	4.70	5.22	6.74½	5.32	5.29	6.65	6.50

Lengths shorter than 1 in. take an extra of 50c. Lengths between 1 in. and 2 in. take an extra of 25c.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+12½%
Galvanized cast steel rigging	7½%
Bright plow steel	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7.50	$6.50	$6.25	$8.50	$7.35
Assorted	.....	7.50	6.50	6.40	8.75	7.60

BAR IRON AND STEEL—Per pound to large buyers at mill, Pittsburgh:

Iron bars.....2.75c. Steel bars.....2.35c.

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver	Chicago
$0.12	$0.16½	$0.18	$0.19	$0.18½	$0.16½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham	Denver
Solid	14c.	13c.	15c.	15c.
Hollow	18c.	14c.	...	20c.

STEEL AND IRON PIPE—The following discounts are for carload lots f.o.b. Pittsburgh, basing card of National Tube Co. for steel pipe, Cardry A. M. Byer's for iron, both dated Mar. 21, 1919.

Inches	Steel Black Per Cent.	Galvanized Per Cent.	Inches	Iron Black Per Cent.	Galvanized Per Cent.
BUTT WELD					
¼ to 3	57½	44	⅛ to 1½	39½	23½
LAP WELD					
2	50½	38	1¼	24½	9½
2½ to 6	53½	41	1½	31½	17½
7 to 12	50½	37	2	32½	18½
13 and 14	41	..	2½ to 6	34½	21½
15	38½	..	7 to 12	31½	18½
BUTT WELD, EXTRA STRONG PLAIN ENDS					
⅛, ¼ and ⅜	46½	29	⅛, ¼ and ⅜	28½	11½
½	51½	39	½	33½	20½
¾ to 1½	55½	43	¾ to 1½	39½	24½
2 to 3	56½	44			
LAP WELD, EXTRA STRONG PLAIN ENDS					
2	48½	37	1¼	25½	10½
2½ to 4	51½	40	1½	31½	17½
4½ to 6	50½	9	2	33½	20½
7 to 8	46½	33	2½ to 4	35½	23½
9 to 12	41½	28	4½ to 6	34½	22½
			7 to 8	26½	14½
			9 to 12	21½	9½

From warehouses at the places named the following discounts hold for steel pipe.

	Black New York	Black Cleveland	Black Chicago
⅛ to 3 in. butt welded	47%	43½%	57½%
3½ to 6 in. lap welded	42%	45½%	53½%

	Galvanized New York	Galvanized Cleveland	Galvanized Chicago
⅛ to 3 in. butt welded	31%	34½%	44%
3½ to 6 in. lap welded	27%	30½%	41%

Malleable fittings, Class B and C, from New York stock sell at list plus 15%. Cast iron, standard sizes, 10%.

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Hot pressed square	$3.25	$1.00	$1.90	$1.40	$2.00	$1.05
Hot pressed hexagon	2.70	1.00	1.90	1.20	2.00	.35
Cold punched square	3.25	1.00	1.90	.75	1.30	1.50
Cold punched hexagon	2.70	1.00	1.90	.75	1.30	1.50

Semifinished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	75%	60–10–10%
Chicago	50%	50%
Cleveland	60–10–10%	60%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅛ by 4 in. and smaller	60%	50%	50–10%
Larger and longer up to 1 in. by 30 in.	50%	40%	40–10%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York..... $2.75 Cleveland..... $3.50 Chicago..... $2.25
For cast-iron washers the base price per 100 lb. is as follows:
New York..... $4.00 Cleveland..... $3.75 Chicago..... $4.00

CONSTRUCTION MATERIALS

ROOFING MATERIALS—Prices per ton f.o.b. New York and Chicago:

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$60.00	$60.50	$61.00	$61.50
Tar pitch (in 400-lb. bbl.)	21.00	18.00	22.00	19.00
Asphalt pitch (in barrels)	34.00	34.00	37.50	37.50
Asphalt felt	63.00	63.00	67.50	67.50

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco:

	1-Ply c.l.	1-Ply l.c.l.	2-Ply c.l.	2-Ply l.c.l.	3-Ply c.l.	3-Ply l.c.l.
No. 1 grade	$1.45	$1.70	$1.80	$2.05	$2.15	$2.40
No. 2 grade	1.30	1.55	1.60	1.85	1.90	2 15

Asbestos asphalt-saturated felt (14 lb. per square) costs $1.58 per ton.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.00 per roll in carload lots and $2.25 for smaller quantities.

Shingles, red and green slate finish, cost $5.00 per square in carloads, $5.25 in smaller quantities, in Philadelphia.

HOLLOW TILE—

	4x12x12	8x12x12	12x12x12
St. Paul	$0.056	$0.11	$0.162
Seattle	.09	.175	.30
Los Angeles*	.082	.154	.236
New Orleans	.165	.22	.325

* F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price per M in carload lots:

	8 x 8-In. x 20 Ft. and Under				12 x 12-In. 20 Ft. and Under	
	P.	Fir	Hemlock	Spruce	P.	Fir
Boston	$50.00	$49.00	$48.00	$48.00	$50.00	$50.00
Cincinnati	40.00	45.00	41.00	.....	46.00	43.00
Kansas City	42.50	45.25	45.25	45.25	47.50	46.25
Seattle	21.50	21.50	21.50	21.50	21.50	21.50
New Orleans	40.00	.....	.....	.....	45.00	.....
St. Paul	50.00	53.00	46.00	46.00	57.00	55.00
Denver	.....	42.00	42.00	42.00	.....	43.00
Atlanta	48.00	53.00	48.00	58.00	58.00	63.00
Montreal	.....	.....	.....	.....	.....	B.C.65.00
Winnipeg	38.00	38.00	.....	38.00	39.00	39.00

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and Gr. 10 In. x 16 Ft.	
	P.	Fir	Hemlock	P.	Fir
Boston	$50.00	$50.00	$48.00	$50.00	$50.00
Cincinnati	41.00	43.00	41.00	39.00	41.00
Kansas City	58.75	62.75	62.75	60.75	69.00
Seattle	21.50	21.50	21.50	21.50	21.50
New Orleans	40.00	.....	.....	50.00	.....
St. Paul	51.00	47.00	40.00	51.00	46.00
Denver	.....	43.50	43.50	.....	40.00
Atlanta	37.50	55.00	.....	45.00	55.00
Los Angeles	.....	36.00	35.00	.....	.....
Montreal	60.00	58.00	44.00	60.00	.....
Winnipeg	105.00	105.00	.....	.....	.....

NAILS—The following quotations are per keg from warehouse:

	Mill Pittsburgh	St. Louis	Dallas	Chicago	San Francisco
Wire	$3.25	$3.90	$5.00	$3.90	$3.90
Cut	4.25	5.50	6.40	5.00	6.40

PORTLAND CEMENT—These prices are for barrels in carload lots, without bags.

	Current	One Month Ago	One Year Ago with Bags
New York	$2.30	$2.45	$2.50
Jersey City	2.27	2.62	2.50
Boston	2.42	2.57	2.87
Chicago	2.00	2.05	2.36
Pittsburgh	2.05	2.15	2.71
Cleveland	2.32	2.22	2.84
Denver	2.57	2.67	3.20

Note—Charge for bags is generally 15c. each, 60c. per bbl.

LIME—Warehouse prices:

	Hydrated per Ton		Lump per 300-Lb. Barrel	
	Finished	Common	Finished	Common
New York	$17.50	$14.50	$2.90	$2.65
Kansas City	22.00	21.00	2.30	2.20*
Chicago	18.00	17.50	1.80*	1.10*
St. Louis	22.00	18.00	.....	1.75*
Boston	22.50	18.25	3.65	3.30
Dallas	2.25*	1.25*	.....	.....
San Francisco	19.00	.....	.....	2.00†
St. Paul	23.00	19.50	1.60*	1.40*
New Orleans	.....	2.00*	.....	1.65*
Atlanta	.....	1.90*	1.75*	1.75*
Denver	20.00	20.00	.....	2.15‡

* 200-lb. barrels. † Per 180-lb. bbl. ‡ Per ton.
Note—Refund of 10c. per barrel.

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw per barrel	$2.15	$1.68	$2.00	$1.80	$2.27	$1.74
5-gal. cans	2.28	1.78	2.25	1.95	2.47	1.94

WHITE AND RED LEADS—in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Current		1 Year Ago		Current Dry and	1 Yr. Ago Dry and
	Dry	In Oil	Dry	In Oil	In Oil	In Oil
100-lb. keg	13.00	14.50	12.15	12.60	13.00	12.15
25- and 50-lb. kegs	13.25	14.75	12.40	12.85	13.25	12.40
12½-lb. keg	13.50	15.00	11.65	13.10	13.50	12.65
5-lb. cans	15.00	16.50	13.15	13.60	15.00	13.65
1-lb. cans	16.00	17.50	14.15	14.60	16.00	14.65

MINING AND MILLING SUPPLIES

HOSE—

	Fire	Air		Steam
	50-Ft. Lengths	First Grade	Second Grade	Third Grade
Underwriters' 2½-in.	70c. per ft.			
Common, 2½-in.	40%			
¾-in. per ft.		$0.50	$0.35	$0.25

Steam—Discounts from List
First grade..... 30% Second grade..... 40% Third grade.....40–10%

LEATHER BELTING—Present discounts from list in the following cities are as follows:

	Medium Grade	Heavy Grade
New York	35%	25%
St. Louis	45%	50%
Chicago	45%	40%
Birmingham	35%	35%
Denver	35-5%	30%

RAWHIDE LACING—30% off for cut; 62c. per sq ft. for side lacing.

MANILA ROPE—For rope smaller than ¾-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¾-in., 8 ft., ½-in., 6; ⅜-in., 4½; 1-in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ¾ in. and larger, in 1200-ft. coils:

Boston	$0.25	Denver	$0.29½
New York	.27	Kansas City	.28
Cincinnati	.29	New Orleans	.27½
Chicago	.26	Seattle	.27½
St. Paul	.28	St. Louis	.26½
San Francisco	.26	Atlanta	.29½

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.95
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

REFRACTORIES—Following prices are f. o. b. works, Pittsburgh:

Chrome brick	net ton	$120.00	at Chester, Penn.
Chrome cement	net ton	65.00	at Chester, Penn.
Clay brick, 1st quality fireclay	net ton	40–30	at Clearfield, Penn.
Clay brick, 2nd quality	net ton	38–48	at Clearfield, Penn.
Magnesite, dead burned	net ton	32.50	at Chester, Penn.
Magnesite brick, 9 x 4½ x 2½ in	net ton	90.00	at Chester, Penn.
Silica brick	net ton	45–55	at Mt. Union, Penn.

Standard size fire brick, 9 x 4½ x 2½ in. The second quality is $4 to $5 cheaper per 1000.
St. Louis—Fire Clay, $35 to $50.
Birmingham—Fire clay, $40–$45; silica, $40-$50; magnesite, $90; chrome, $120.
Chicago—Second quality, $25 per ton.

RAILWAY TIES—For fair size orders, the following prices per tie hold:

	Material	7 In. x 9 In. by 8 Ft. 6 In.	6 In. x 8 In. by 8 Ft.
Chicago	Plain	1.48	1.33
San Francisco	Douglas Fir—Green	1.35	.96
San Francisco	Doug as Fir—Creosoted	2.72	1.92

Prices per tie at Missouri mills; St. Louis prices about 25c. higher:

Untreated A Grade White Oak 6x8x8		Untreated A Grade Red Oak 6x8x8	
No. 1	$0.70	No. 1	$0.55
No. 2	.80	No. 2	.65
No. 3	.90	No. 3	.75
No. 4	.98		
7x9x8 white oak	1.05		
7x9x8 red oak, No. 4	.80	No. 5	.87

FLOTATION OILS—Prices of oils for flotation, in cents per gallon, in barrels

	New York	Chicago In Bbl.	Chicago Carloads	Denver
Pure steam-distilled pine oil, sp.gr. 0.925-0.94	$0.75	$0.71	$0.69	$ 0 81
Pure destructively distilled pine oil	.65	.68†	.66†	.53–.68
Pine tar oil, sp.gr. 1.02—1.035	.45	.36	.34	.40–.47
Crude turpentine	.61	.68	.66	.53–.63
*Hardwood creosote, sp.gr. 0.96–0.99	.24	.....	.....	.50–.57

* F.o.b. Cadillac. Mich,

COTTON WASTE—The following prices are in cents per pound:

	New York Current	New York One Year Ago	Cleveland	Chicago
White	11.00 to 13.00	13.00	16.50	12.00 to 16.50
Colored mixed	8.50 to 12.00	10.00	13.00	11.50 to 14.00

WIPING CLOTHS—Jobbers' price per 1000 is as follows:

	13¼x13¾	13¼x20½
Cleveland	$52.00	$58.00
Chicago	48.00	50.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25 lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....	$0.27½	$0.30	.....	$2.40
Boston	$0.22½	.24½	.26½	$0.31	2.40
Cincinnati	.19½	.21½	.23½	.....	2.35
Kansas City	.19	.23½	.26½	.30	2.45
New Orleans	.23¾ (50%)	.22½	.24½	.....	.....
Seattle	.14½	.18½	.25½	.31½	1.90
Chicago	.18½	.21½	.25½	.29½	2.15
St. Paul	.19	.23½	.26½	.....	2.45
St. Louis	.19	.23½	.25½	.30	2.35
Denver	.17½	.22	.24½	.28½	2.60
Dallas	.189	.225	.228	.342	.....

CHEMICALS

SODIUM CYANIDE—New York price is 31c. per lb.; Denver, 42c.; Chicago, 31½c.; St. Louis, 31c.

SODIUM SULPHIDE—In New York the price per pound is 4½c. for concentrated, 2c. for crystals. The St. Louis price is 6c. for 2½c. for crystals. The Denver price is 32c. The Chicago price is 6c. for concentrated, 3½c. for crystals. Concentrated comes in 500-lb. drums, the crystals in 440-lb. bbl.

ZINC DUST—For 350 mesh the New York price is 10c. per lb.; Chicago, 13c., Denver, 13c. St. Louis, 11c., less than car lots 12c.

ALUMINUM DUST—Chicago price is 1.30 per lb.

MINERS' LAMP CARBIDE—Prices net f.o.b. cars at warehouse points.

	Union 100-Lb. Drums Per Ton	Cameo 100-Lb. Drums Per Ton	Union 25-Lb. Drum Per Drum
East of the Mississippi, North of Chattanooga	$106.00	$101.00	$1.52
Southeastern portion U. S. A.	115.50	110.50	1.63
Texas (except El Paso)	124.00	119.00	1.74
El Paso, Texas	126.00	121.00	1.77
Denver, Colo	124.00	119.00	1.74
West Coast	129.00	124.00	1.81